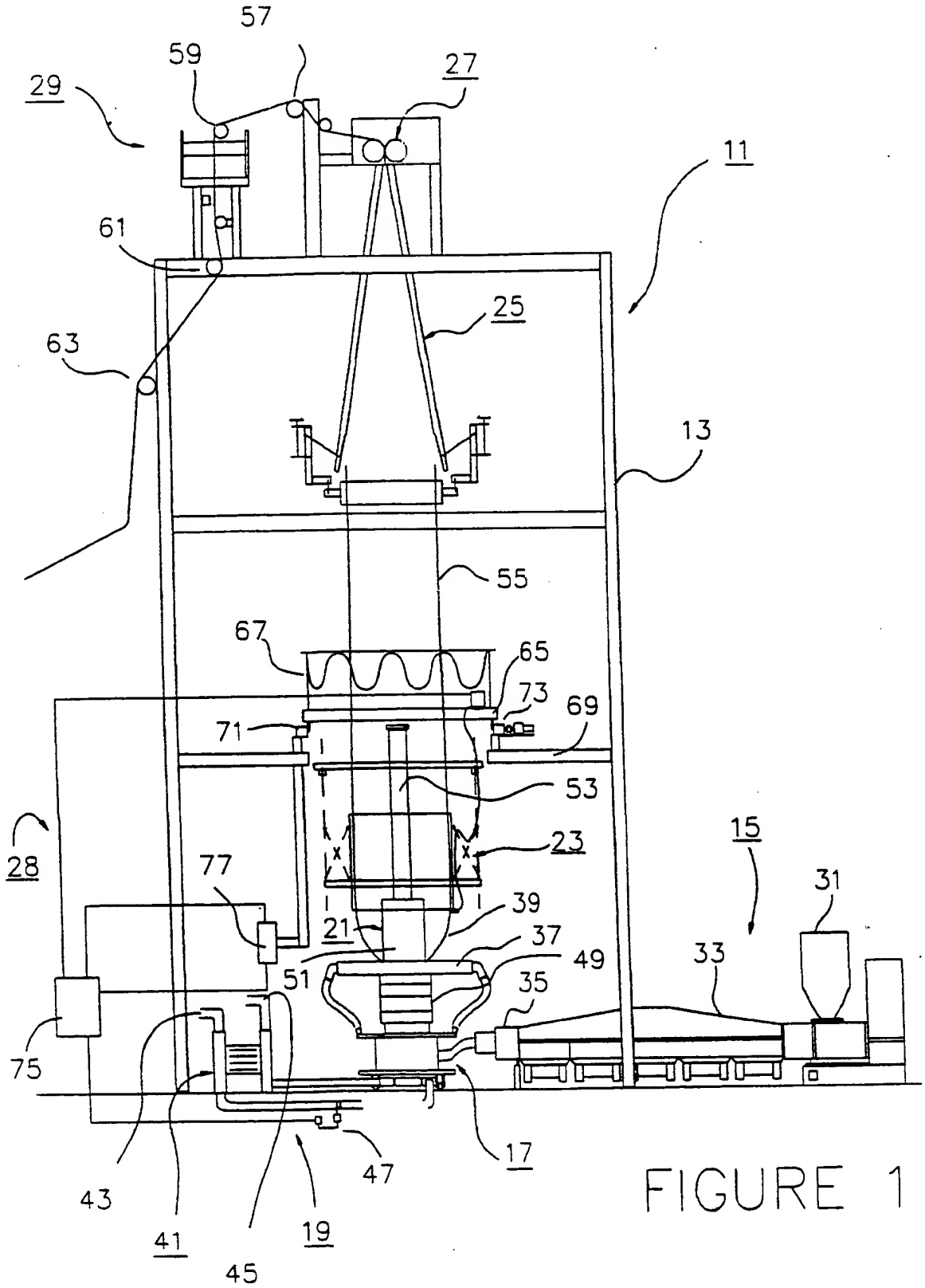

57
59
27
29
11
61
25
63
13
55
67
65
73
69
71
53
15
23
28
77
31
39
21
37
49
33
51
35
75
17
43
47
41
19
45

FIGURE 1

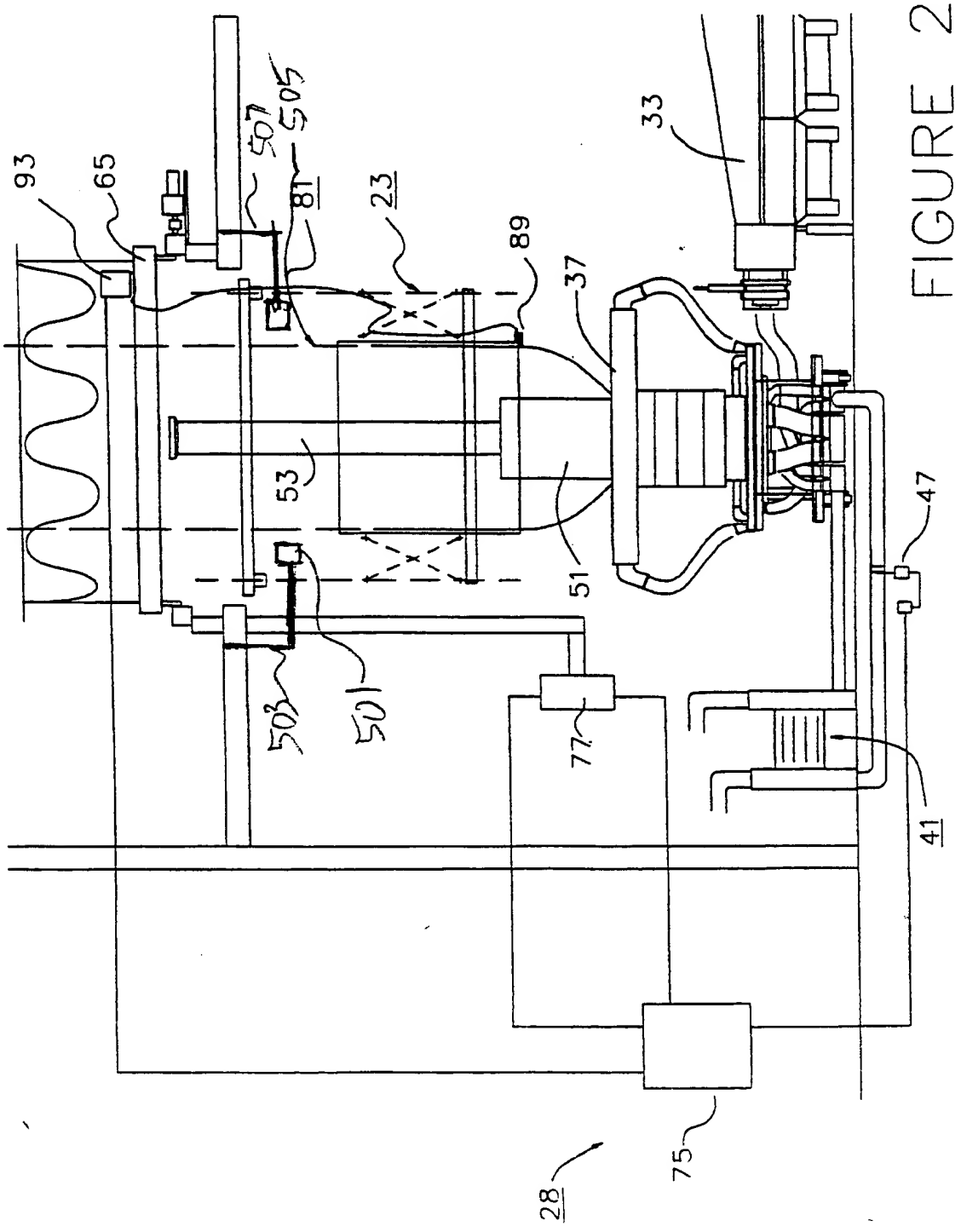


FIGURE 2

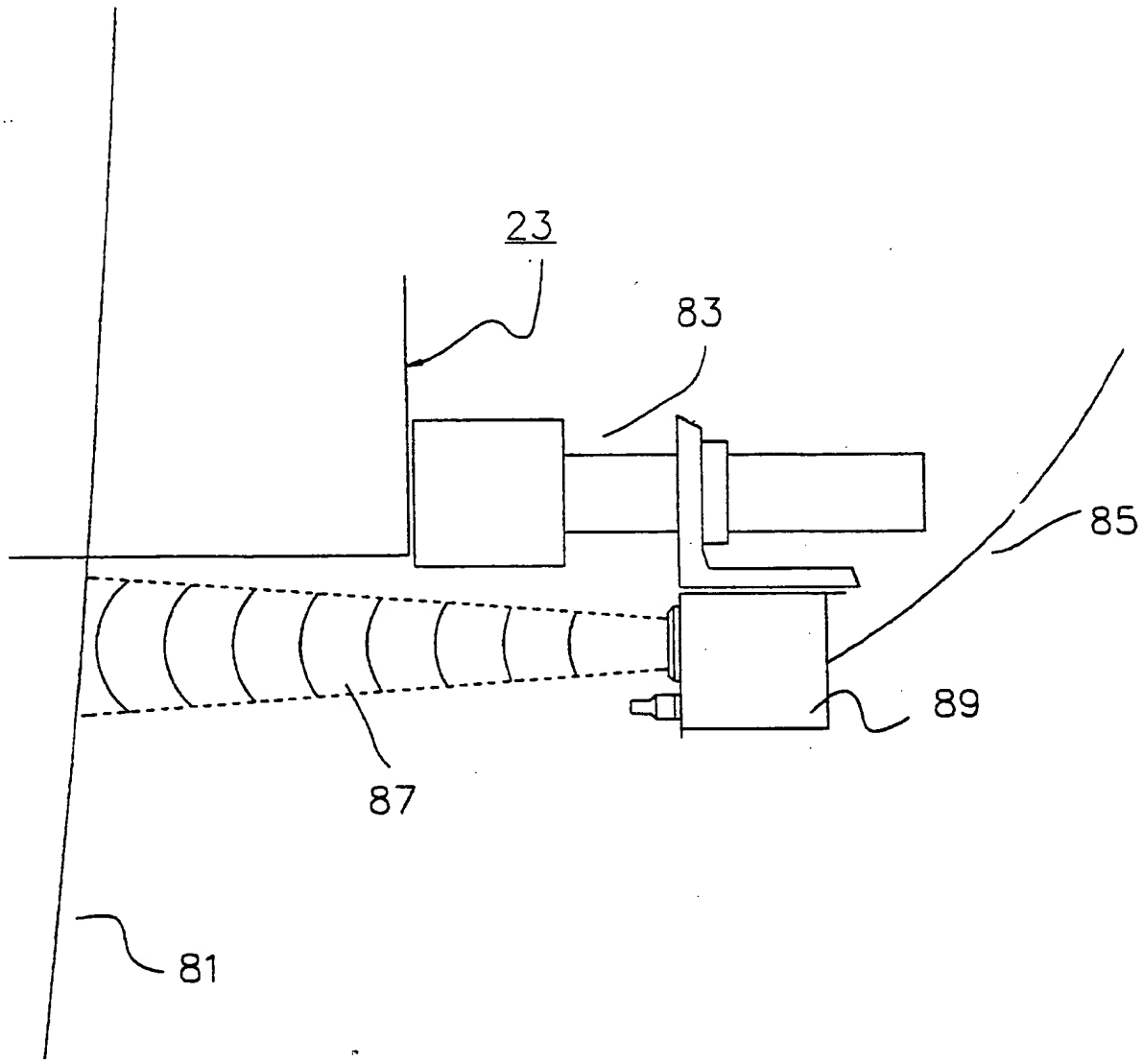


FIGURE 3

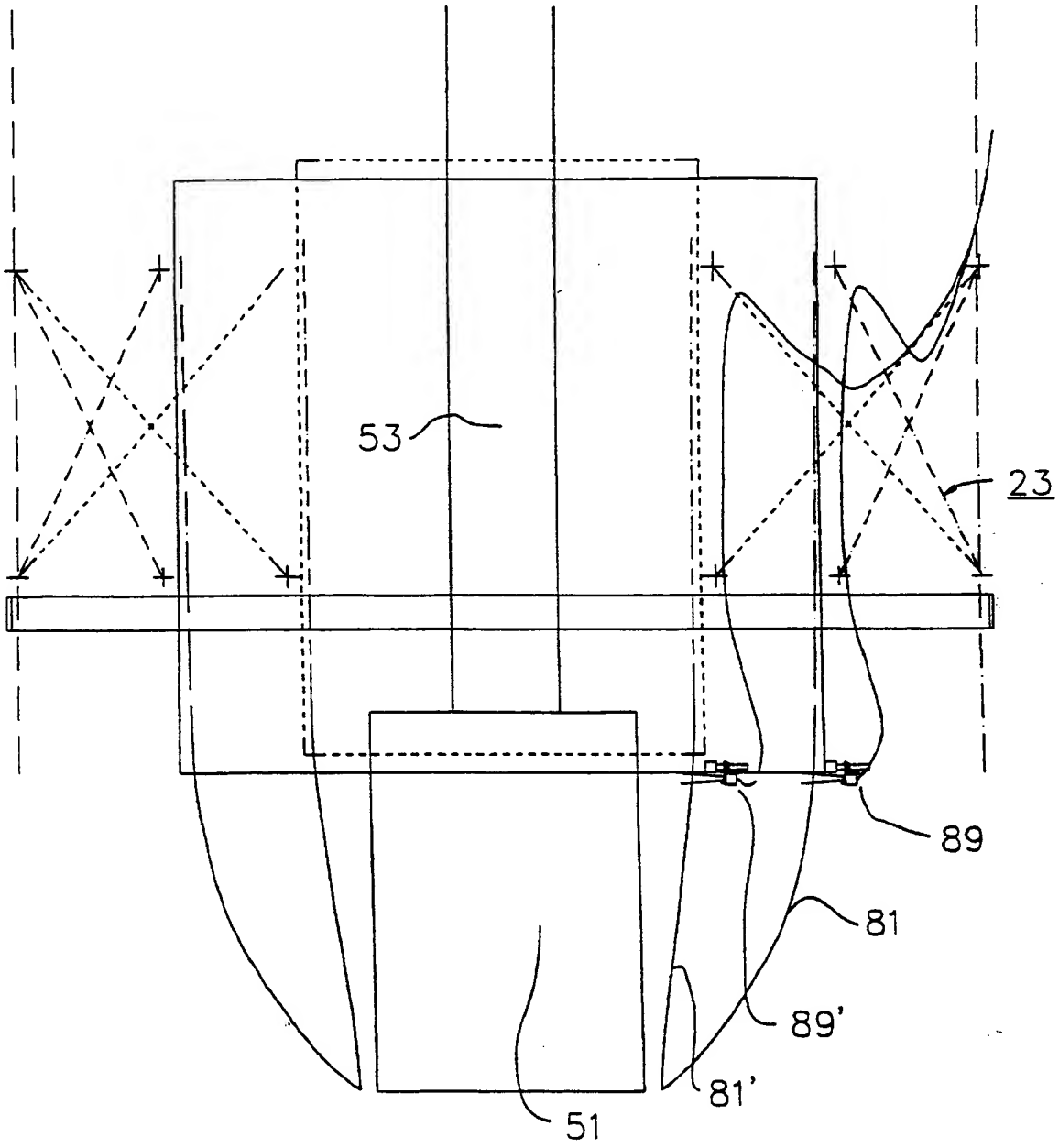


FIGURE 4

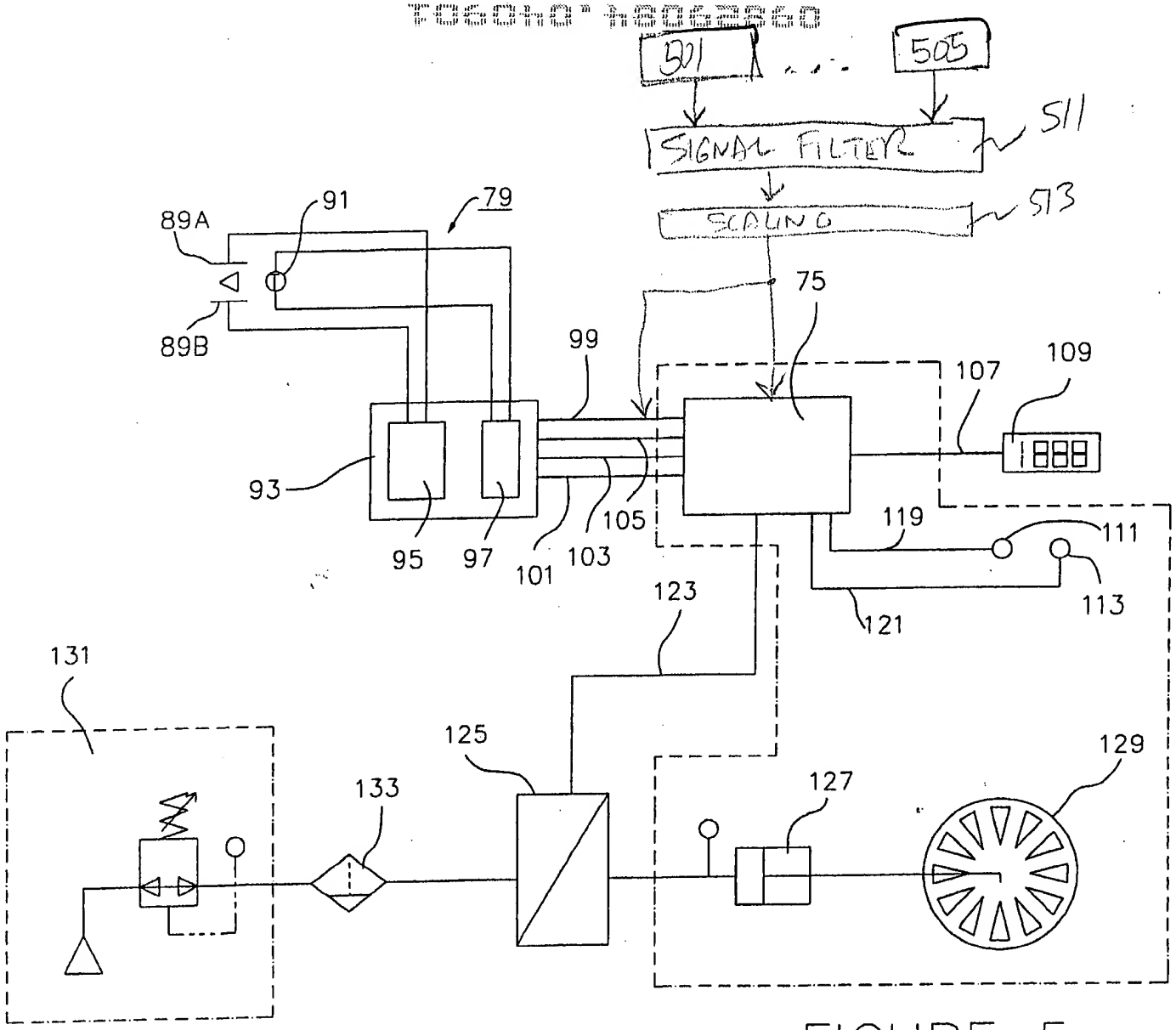

501
505
SIGNAL FILTER
511
SCALING
513
89A
91
79
89B
75
99
107
109
93
95
97
101
103
105
119
111
113
121
123
131
125
133
127
129

FIGURE 5

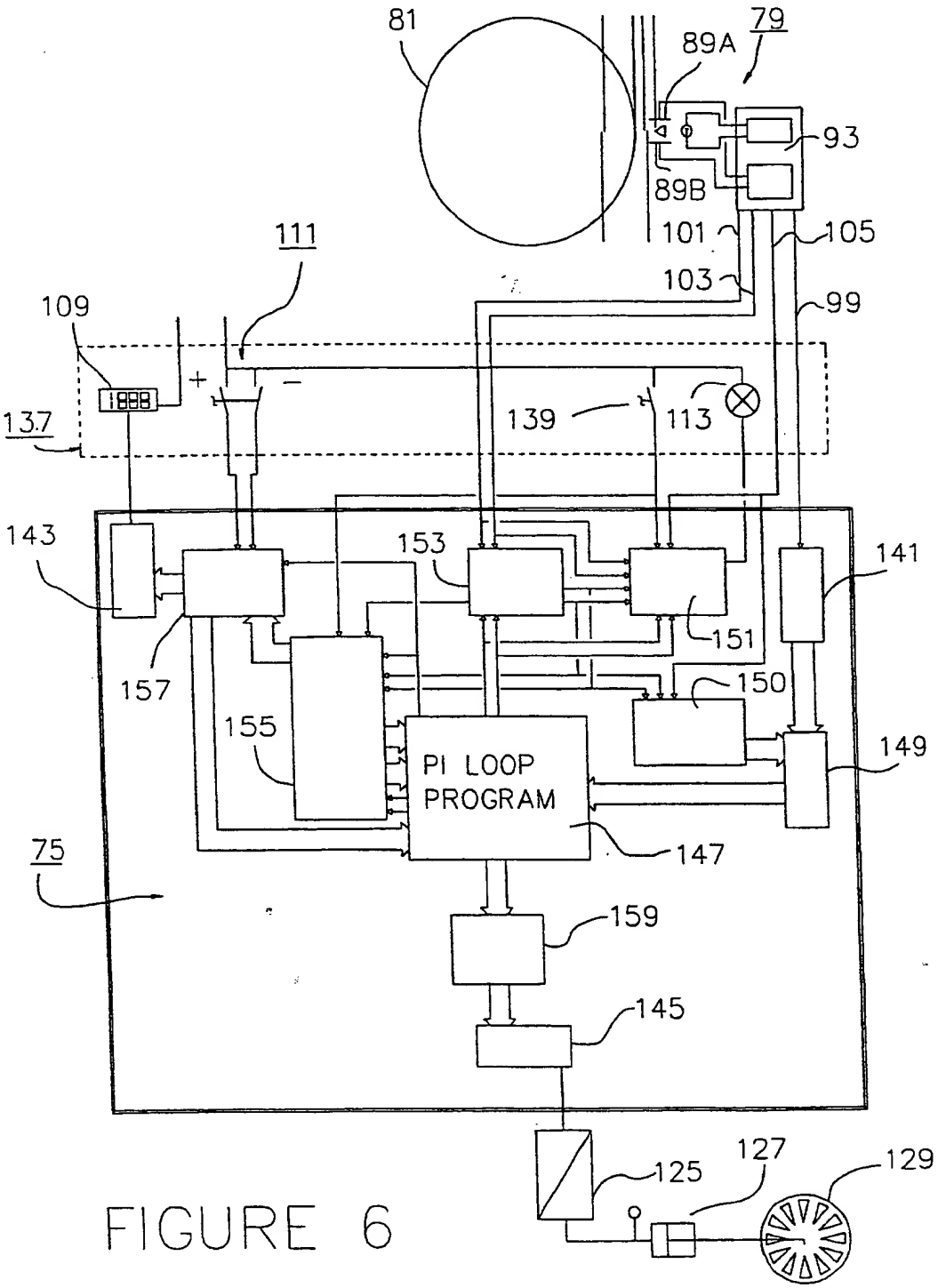

81
79
89A
93
89B
101
105
111
103
99
109
1888
+
−
137
139
113
143
153
141
151
157
150
155
149
PI LOOP
PROGRAM
75
147
159
145
125
127
129

FIGURE 6

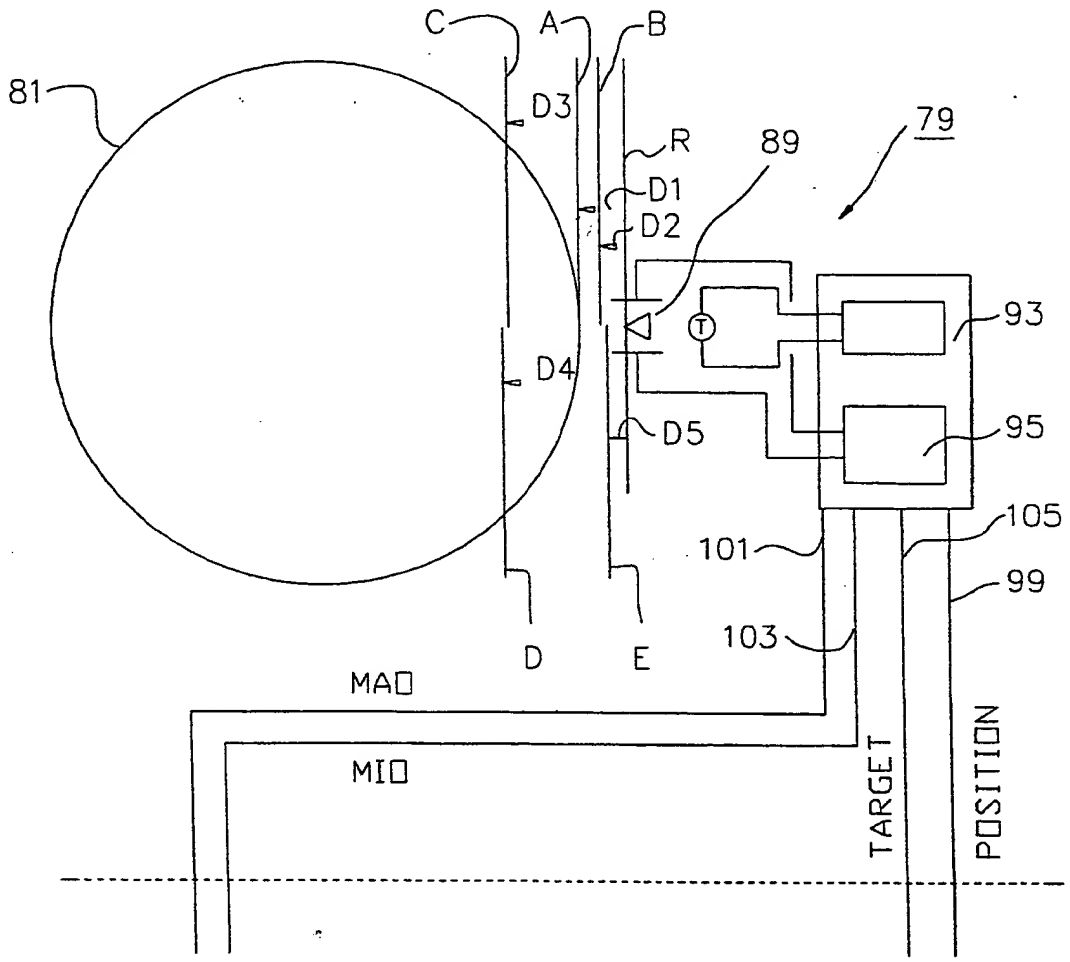

C
A
B
81
D3
R
89
79
D1
D2
93
D4
95
D5
105
101
99
103
D
E
MA□
MI□
TARGET
POSITION

FIGURE 7A

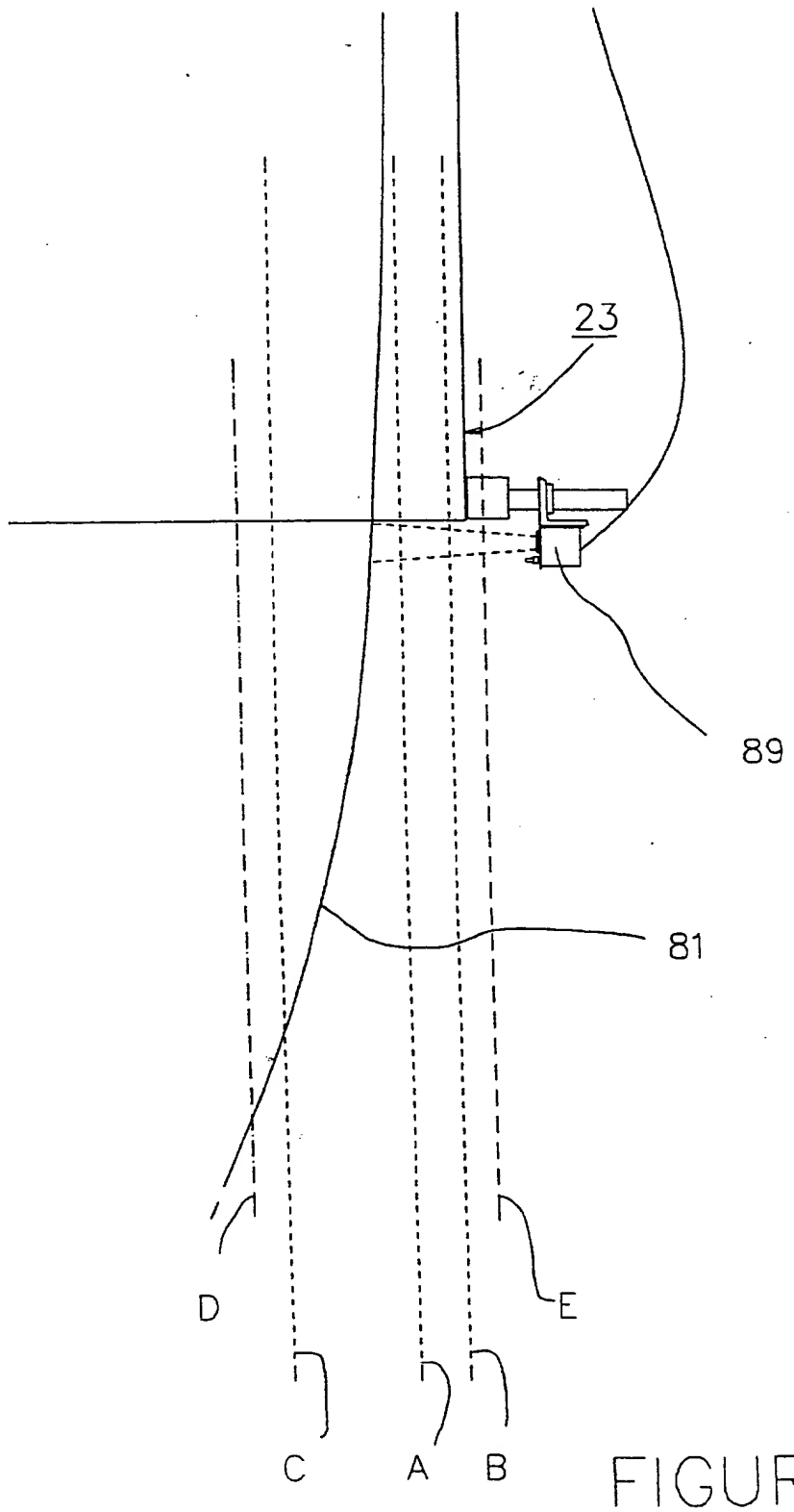


FIGURE 7B

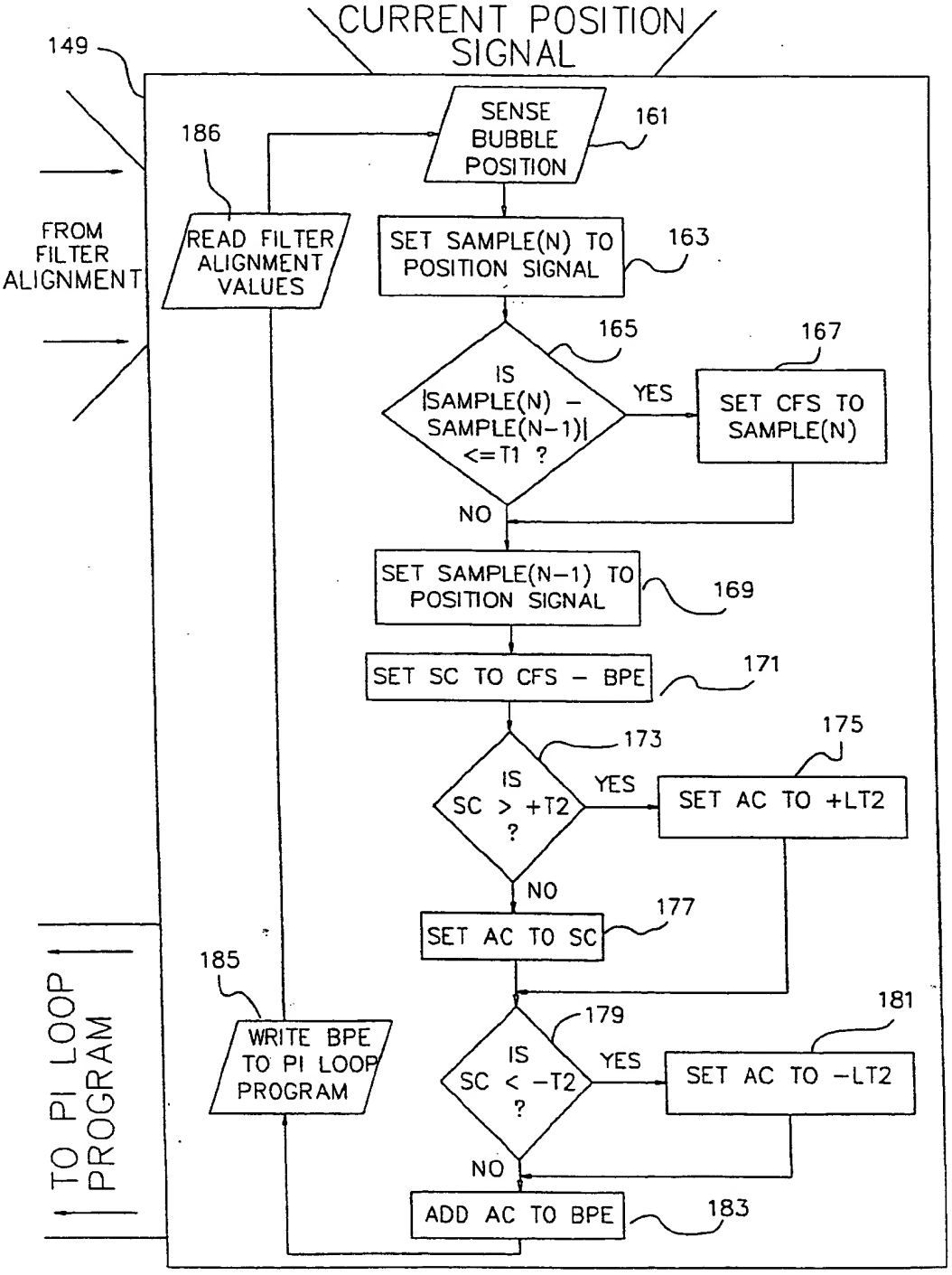

CURRENT POSITION SIGNAL
149
SENSE BUBBLE POSITION
161
186
FROM FILTER ALIGNMENT
READ FILTER ALIGNMENT VALUES
SET SAMPLE(N) TO POSITION SIGNAL
163
165
IS |SAMPLE(N) − SAMPLE(N−1)| <=T1 ?
YES
167
SET CFS TO SAMPLE(N)
NO
SET SAMPLE(N−1) TO POSITION SIGNAL
169
SET SC TO CFS − BPE
171
173
IS SC > +T2 ?
YES
175
SET AC TO +LT2
NO
SET AC TO SC
177
185
WRITE BPE TO PI LOOP PROGRAM
179
IS SC < −T2 ?
YES
181
SET AC TO −LT2
NO
ADD AC TO BPE
183
TO PI LOOP PROGRAM

FIGURE 8A

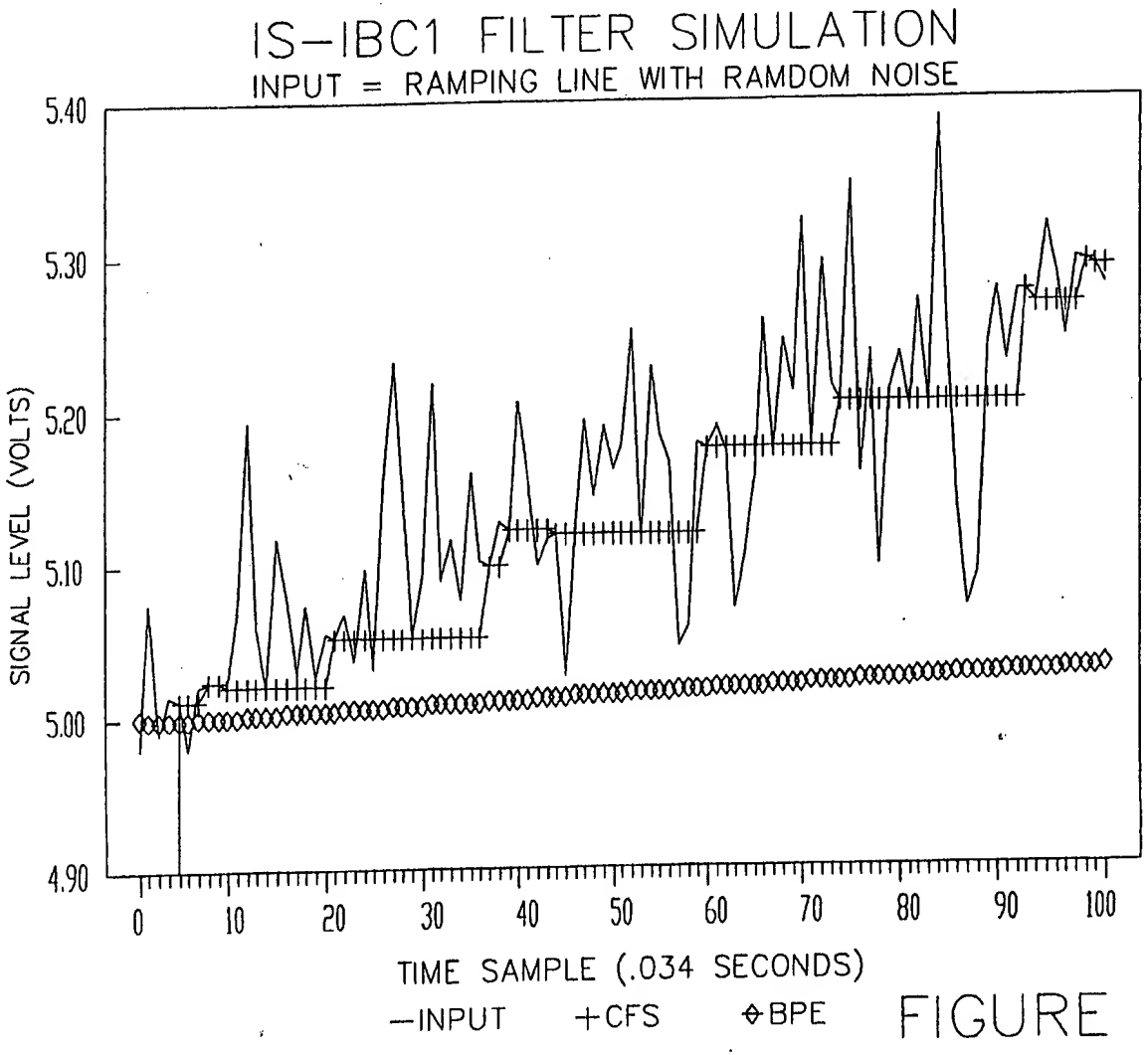

IS-IBC1 FILTER SIMULATION
INPUT = RAMPING LINE WITH RAMDOM NOISE
SIGNAL LEVEL (VOLTS)
5.40
5.30
5.20
5.10
5.00
4.90
0
10
20
30
40
50
60
70
80
90
100
TIME SAMPLE (.034 SECONDS)
—INPUT
+CFS
◆BPE

FIGURE 8B

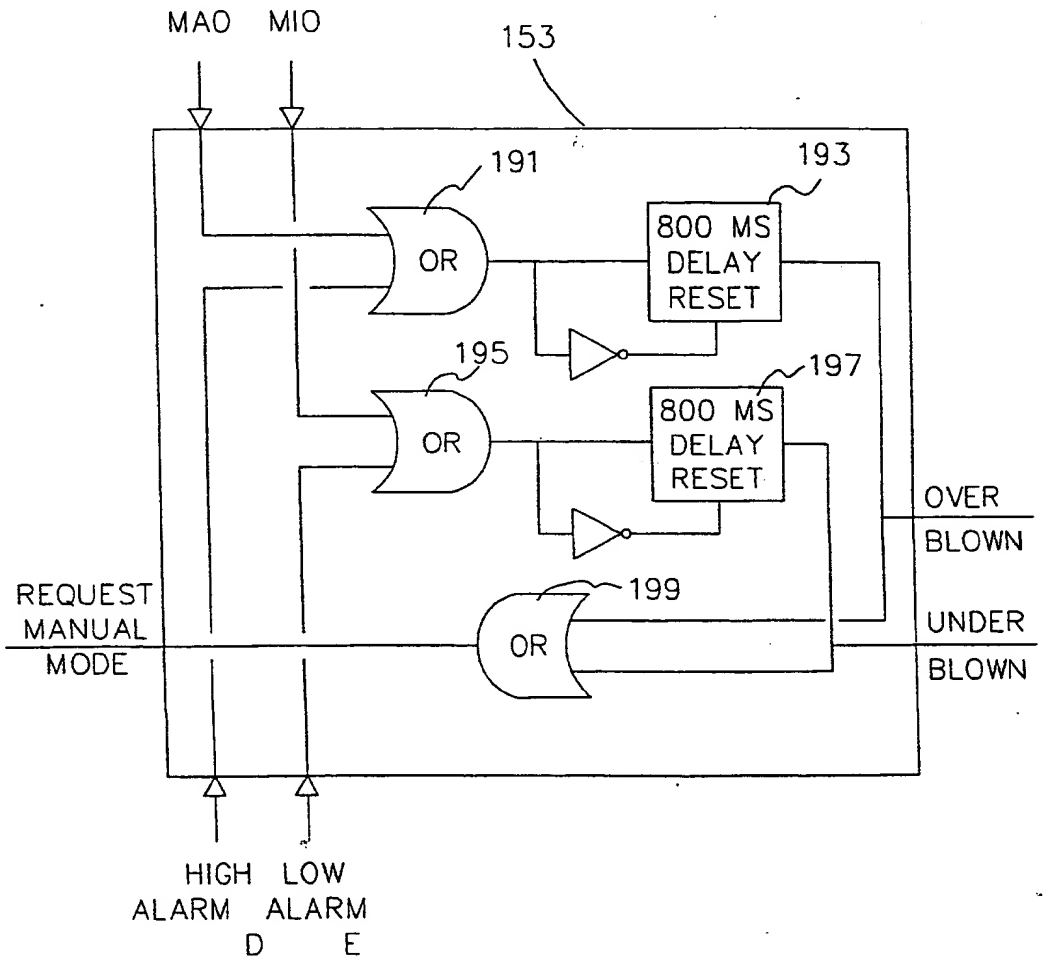

MAO
MIO
153
191
193
OR
800 MS
DELAY
RESET
195
197
OR
800 MS
DELAY
RESET
OVER
BLOWN
199
REQUEST
MANUAL
MODE
OR
UNDER
BLOWN
HIGH
ALARM
D
LOW
ALARM
E

FIGURE 9

T0680"+8062860

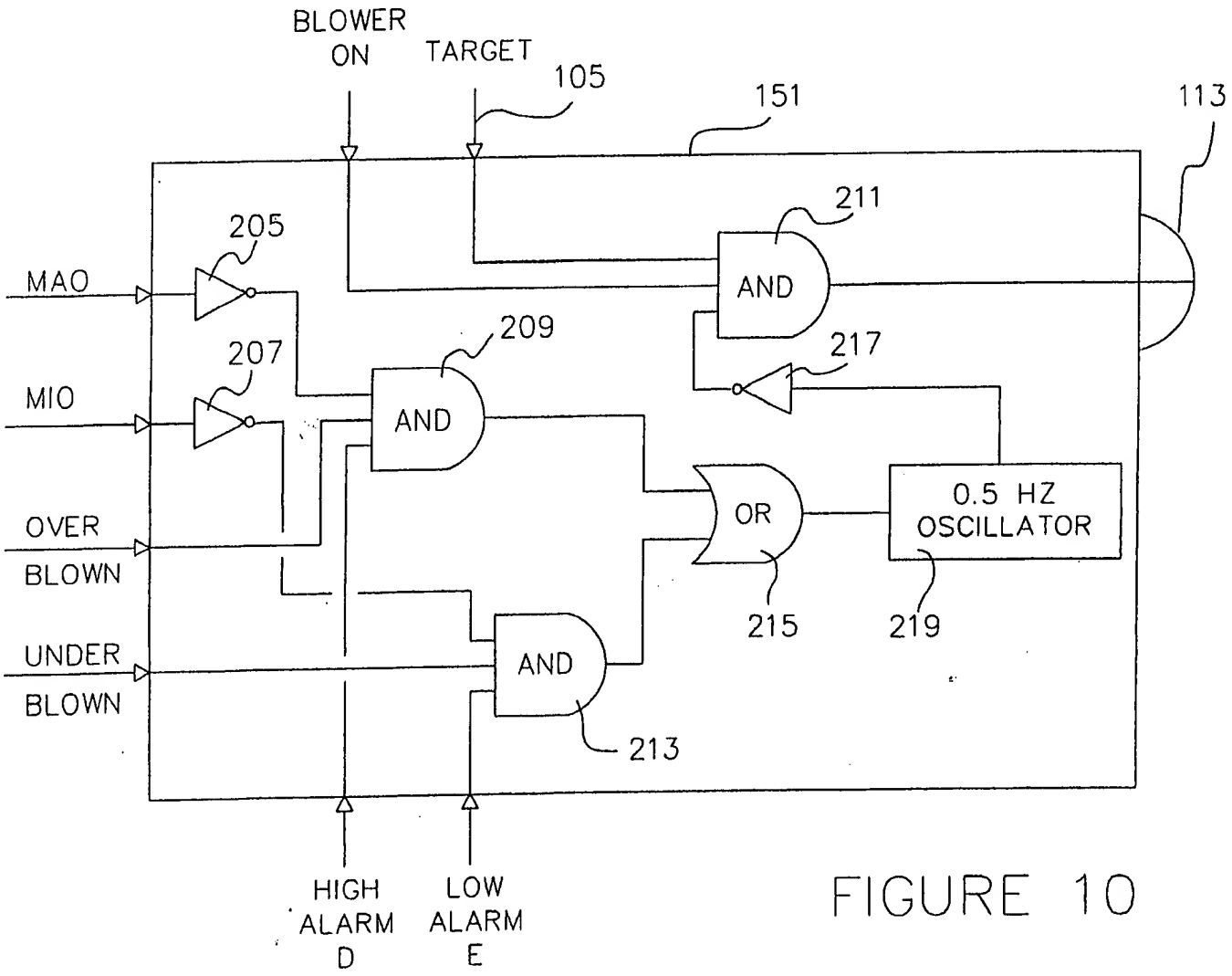


FIGURE 10

TOSHO-H0062850

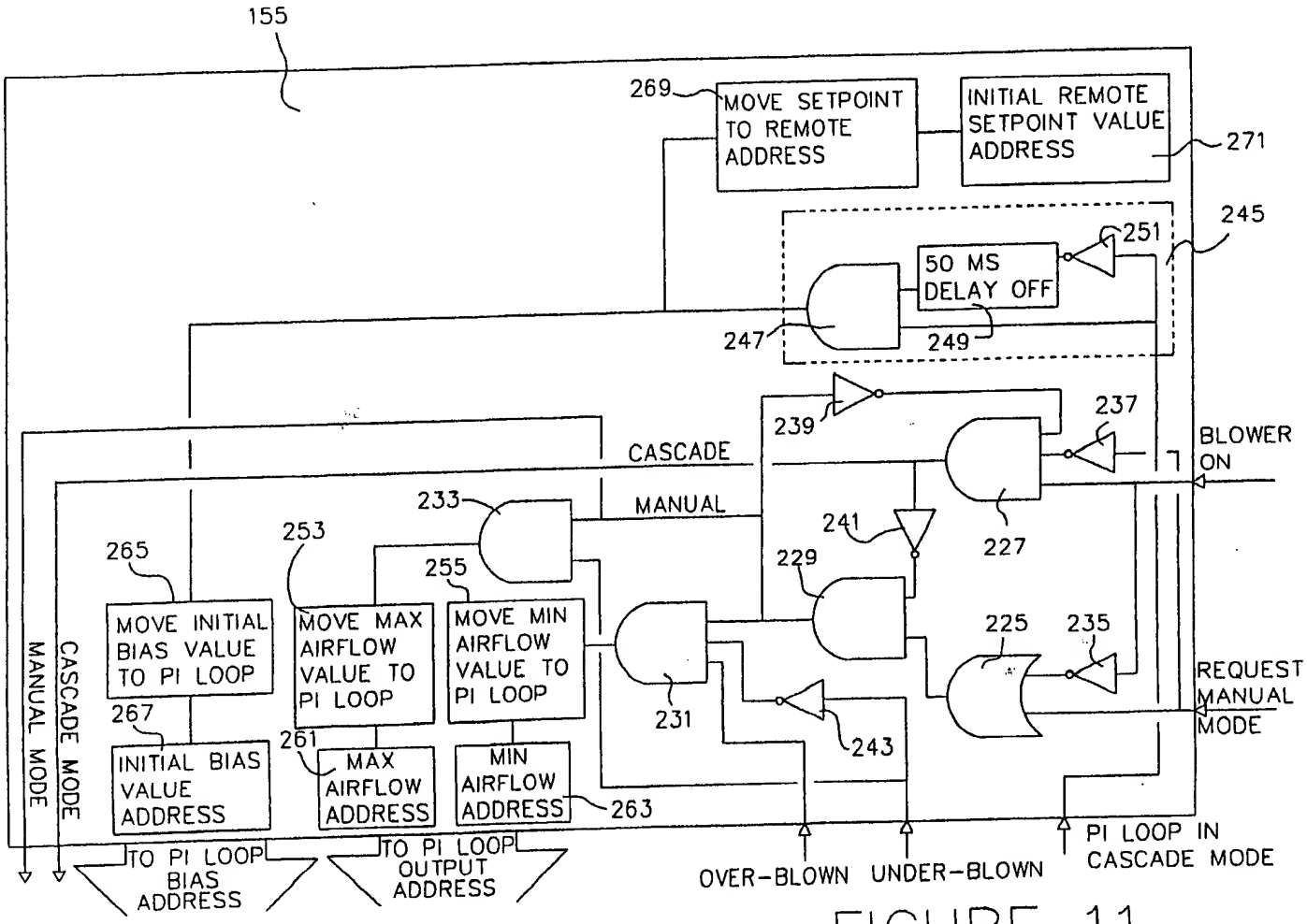


FIGURE 11

T06040 "30626"

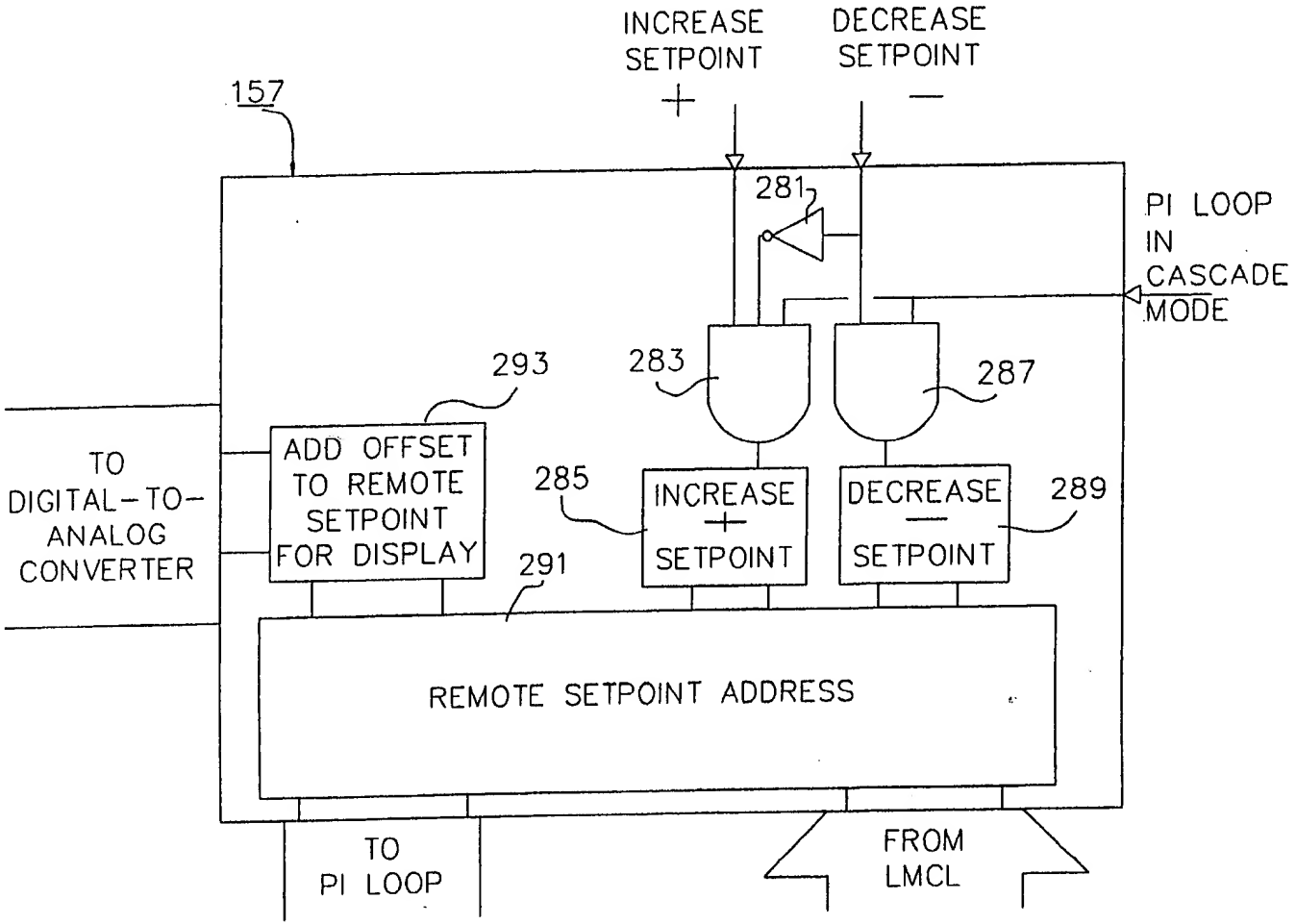


FIGURE 12

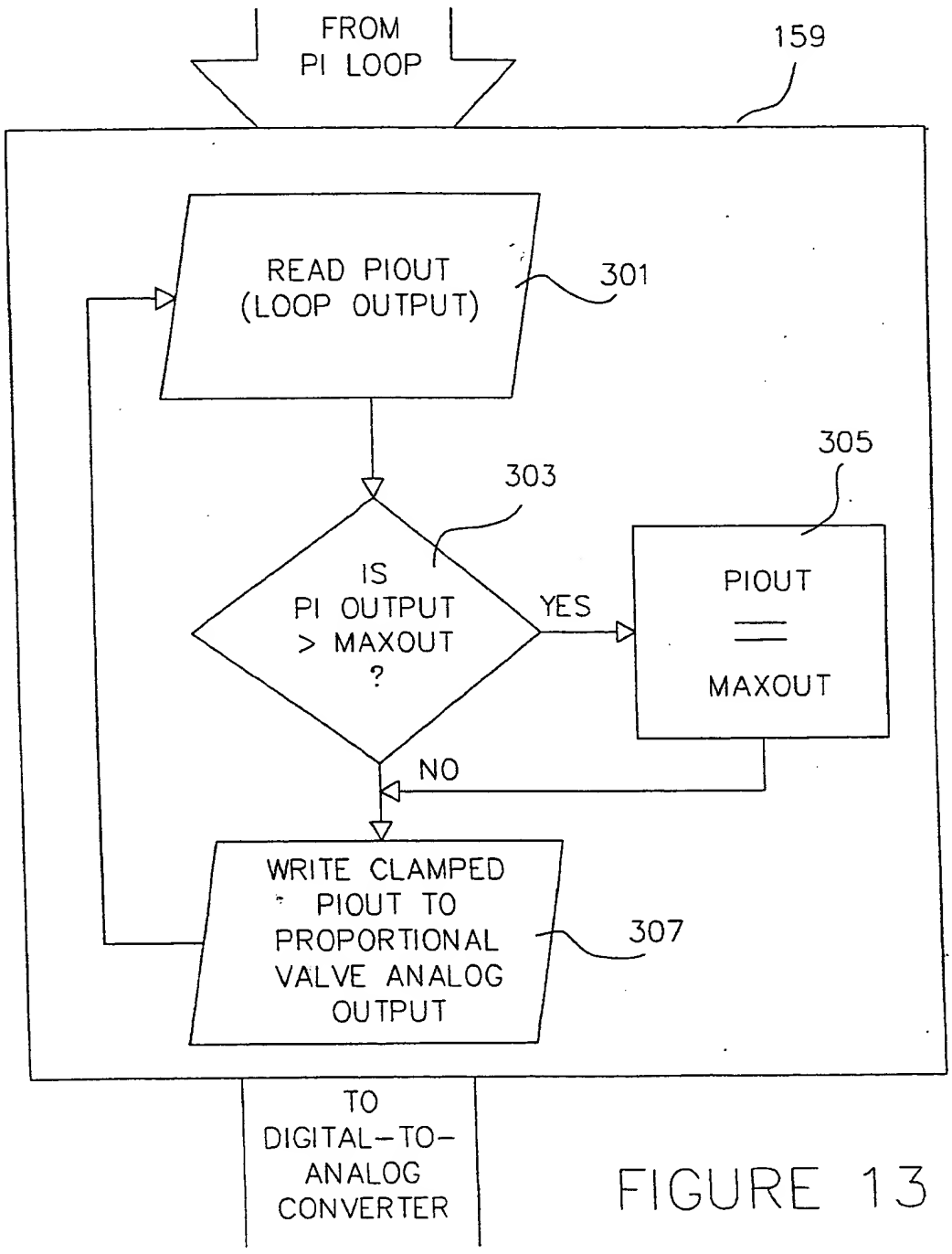

FROM
PI LOOP
159
READ PIOUT
(LOOP OUTPUT)
301
303
IS
PI OUTPUT
> MAXOUT
?
YES
305
PIOUT
=
MAXOUT
NO
WRITE CLAMPED
PIOUT TO
PROPORTIONAL
VALVE ANALOG
OUTPUT
307
TO
DIGITAL-TO-
ANALOG
CONVERTER

FIGURE 13

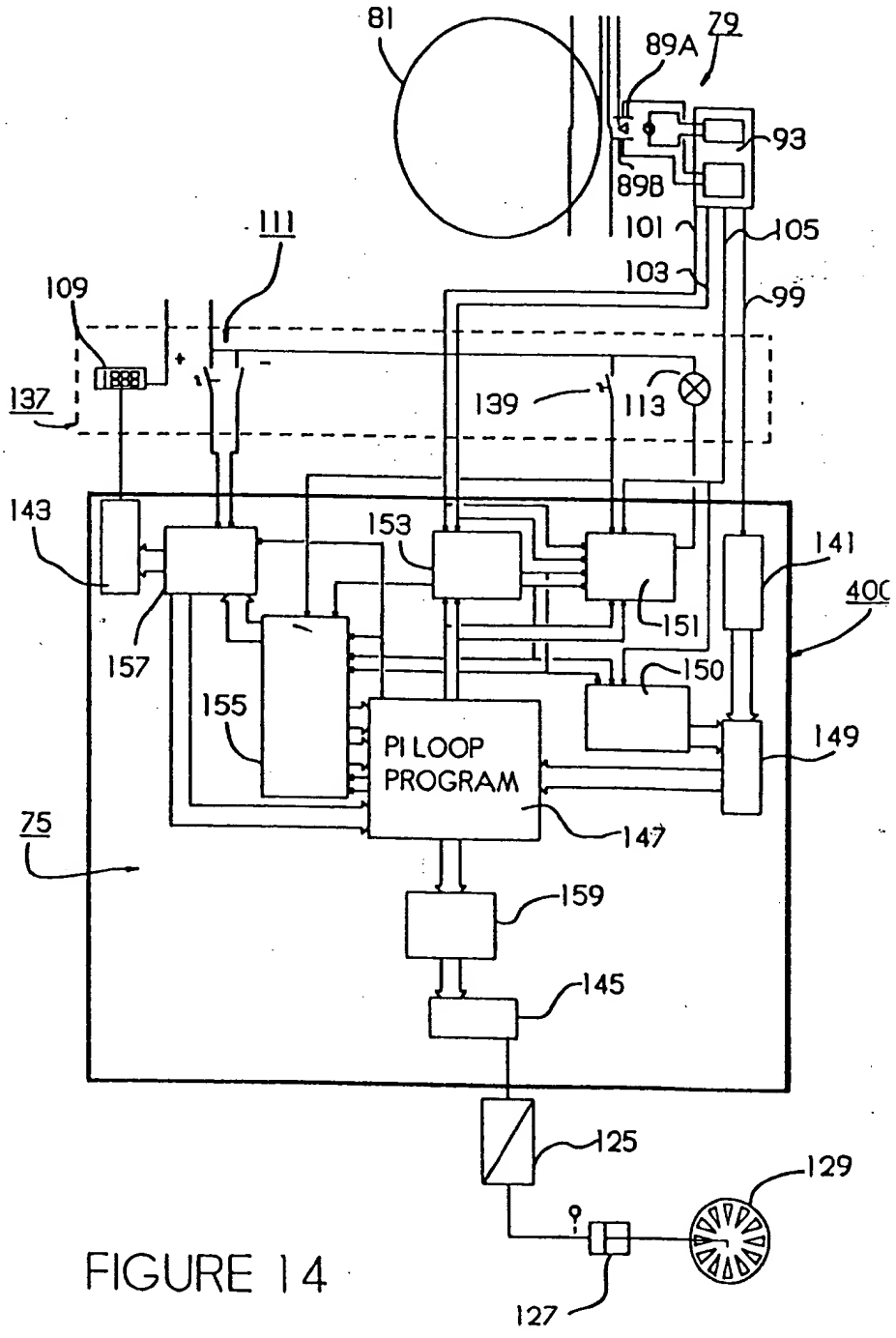

81
79
89A
93
89B
101
105
103
99
111
109
137
139
113
143
153
141
400
151
157
150
155
PI LOOP
PROGRAM
149
75
147
159
145
125
129
127

FIGURE 14

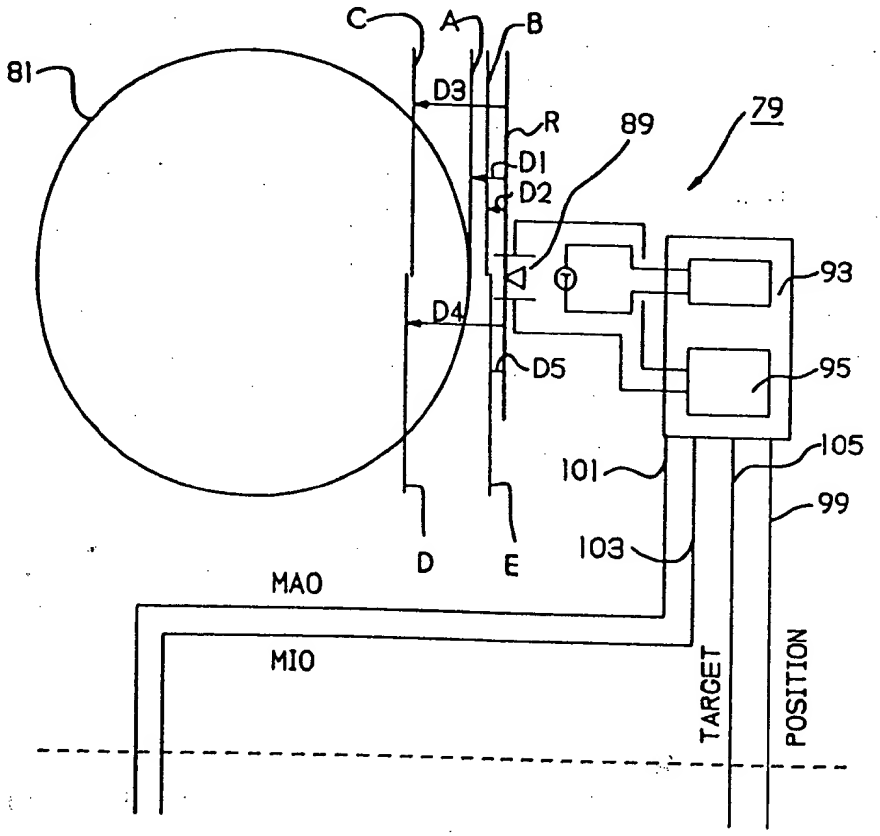

C
A
B
81
D3
R
89
79
D1
D2
93
D4
D5
95
101
105
99
103
D
E
MAO
MIO
TARGET
POSITION

FIGURE 15

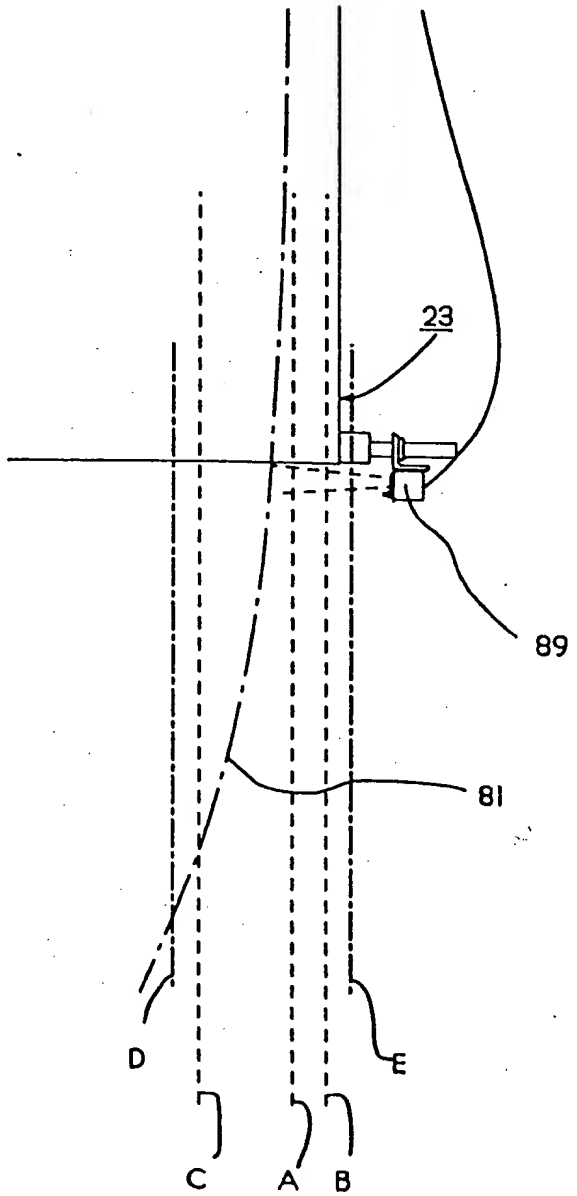


FIGURE 16

T0600"4806860

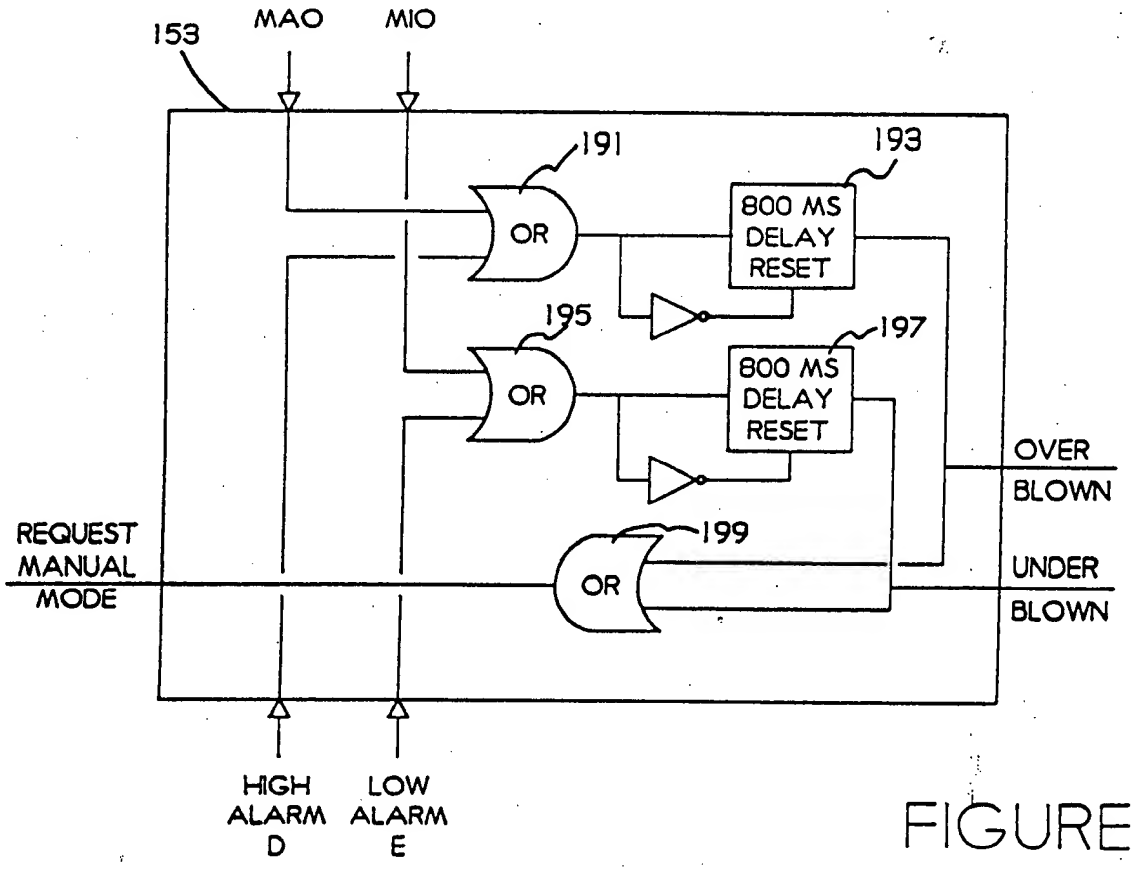


FIGURE 17

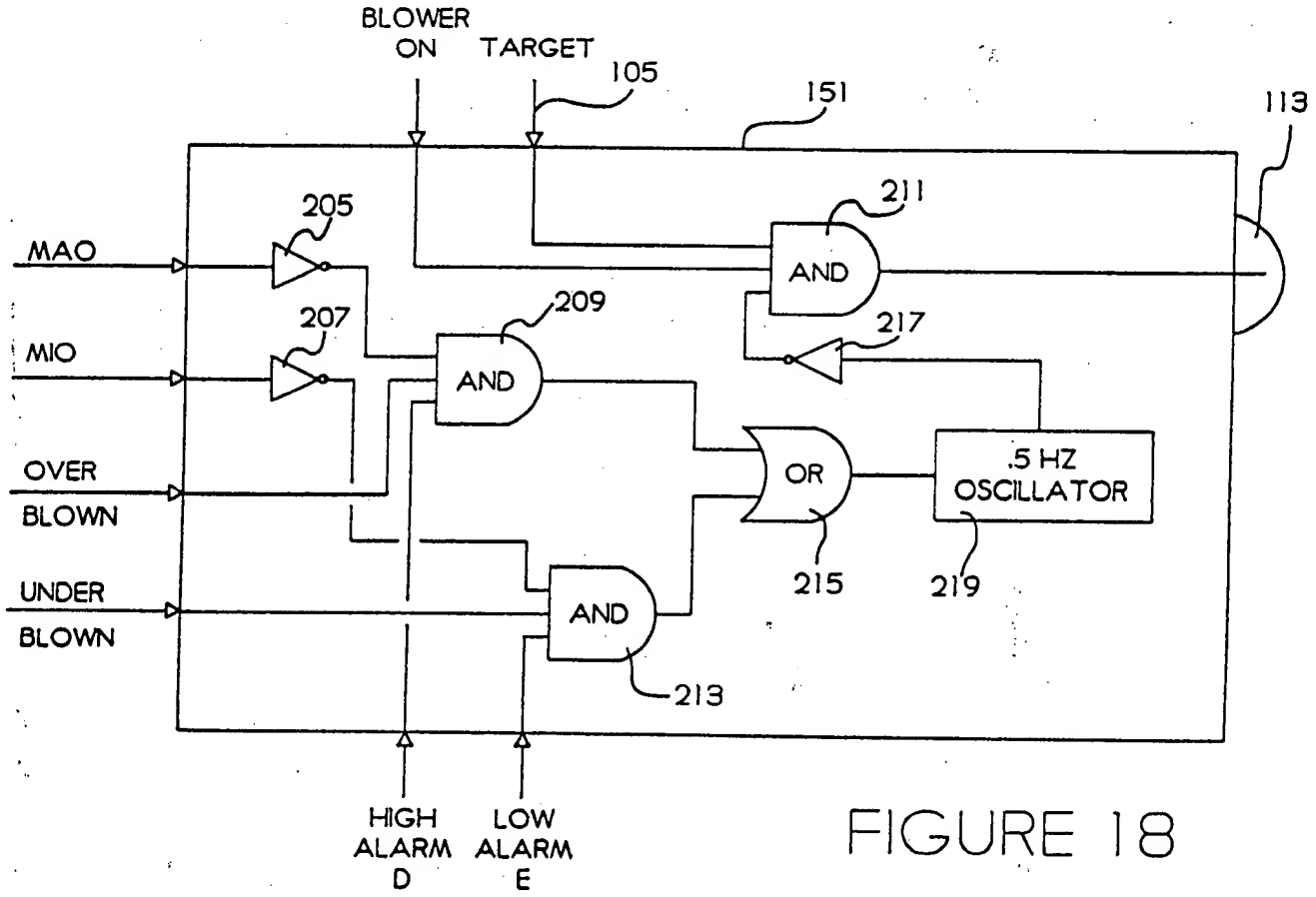
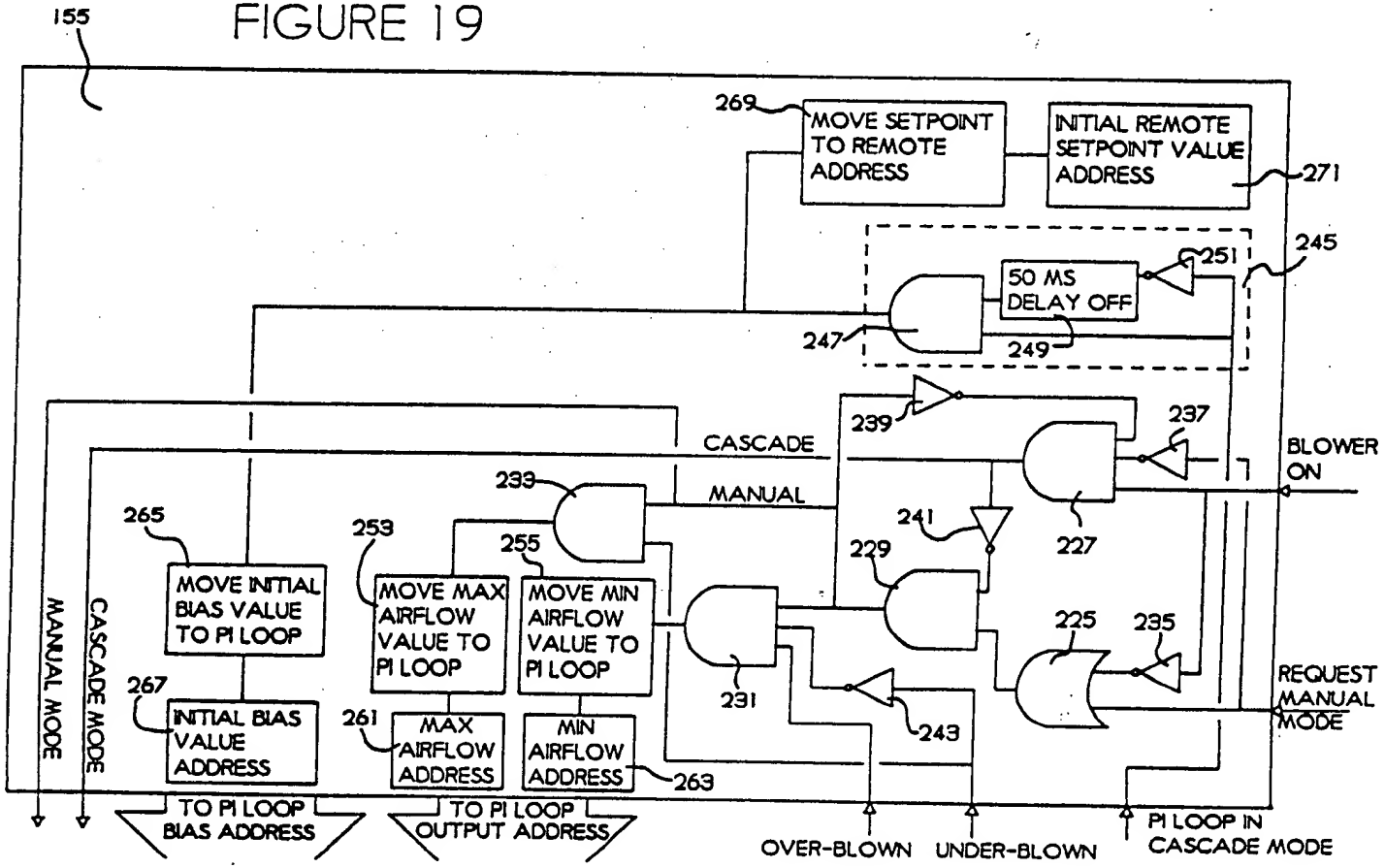

BLOWER ON
TARGET
105
151
113
205
211
MAO
AND
207
209
217
MIO
AND
OVER BLOWN
OR
.5 HZ OSCILLATOR
UNDER BLOWN
AND
215
219
213
HIGH ALARM D
LOW ALARM E

FIGURE 18

T0800-A00230

FIGURE 19



Tasha Technologies

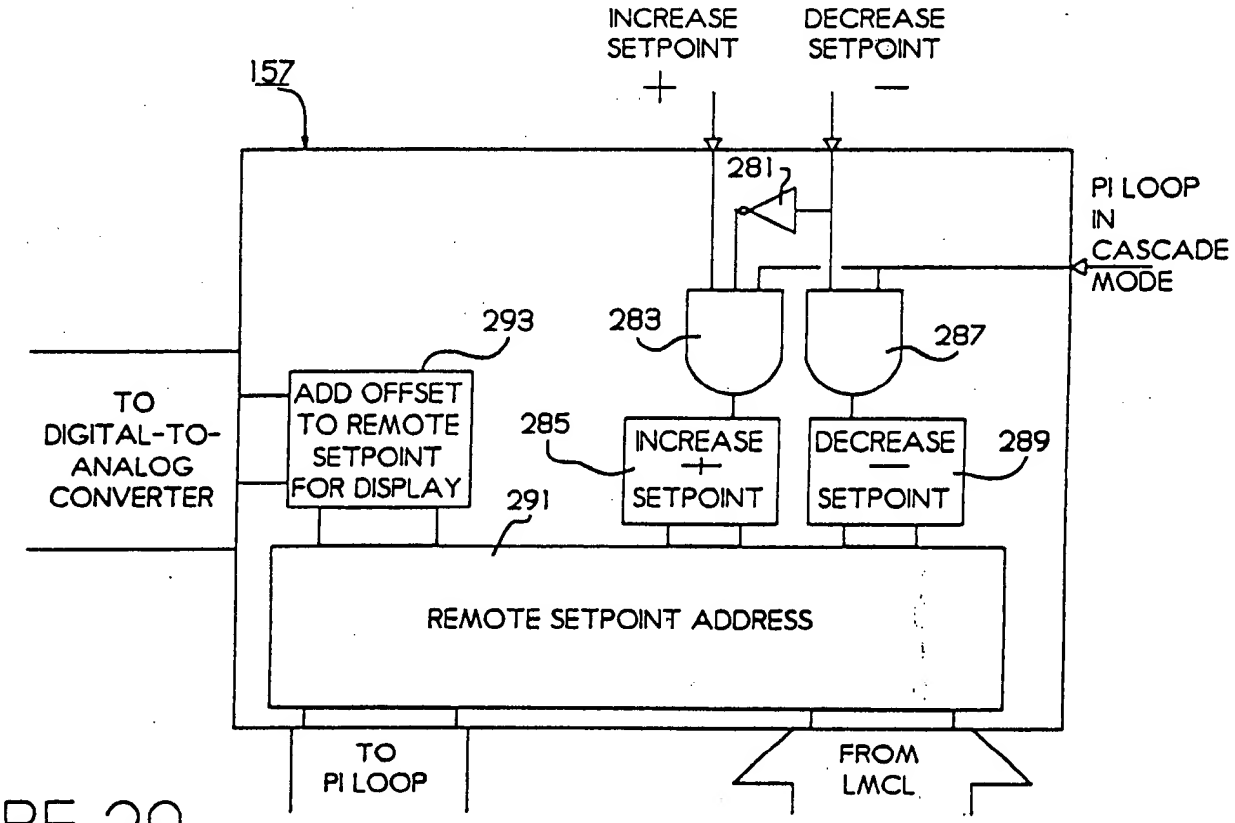


FIGURE 20

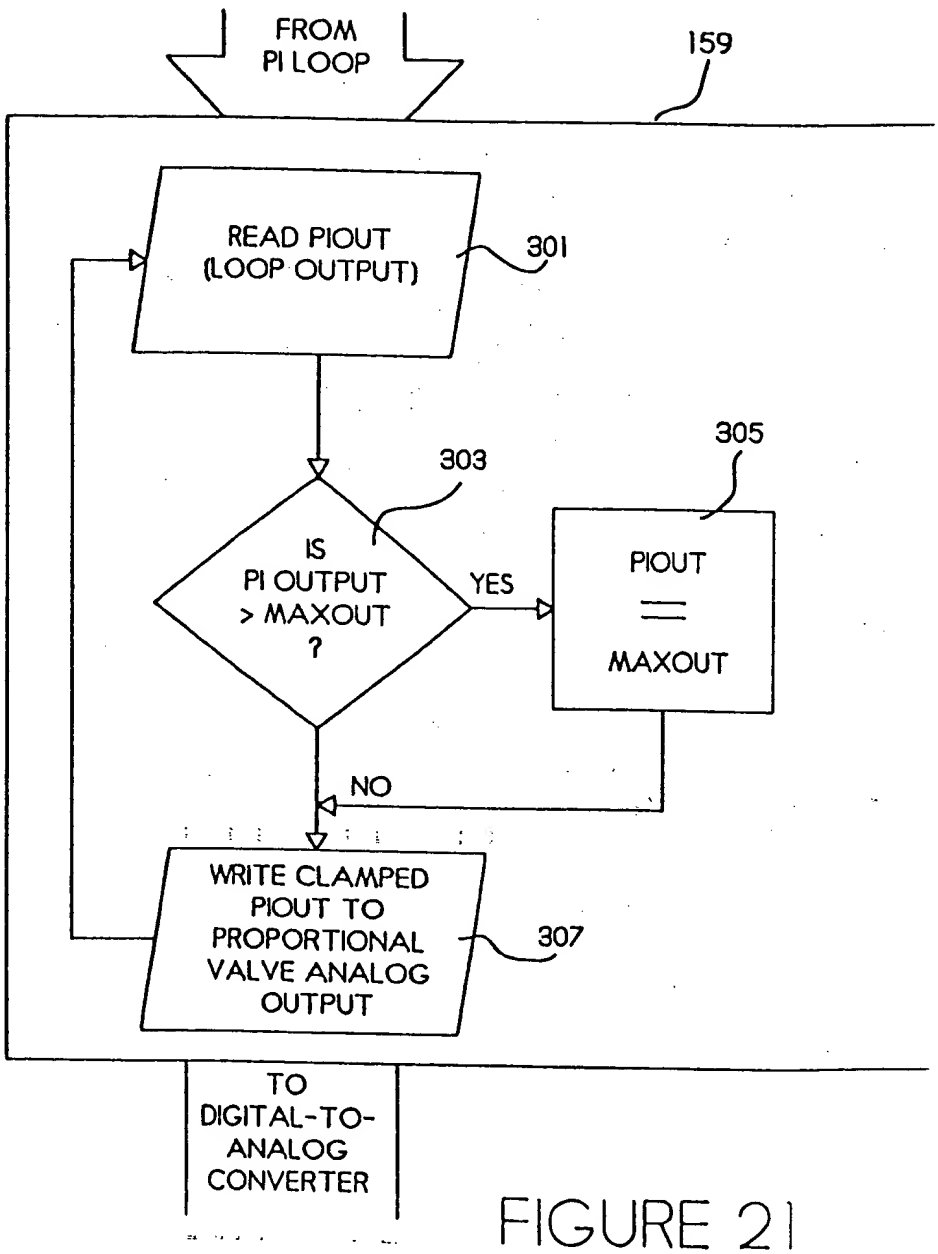
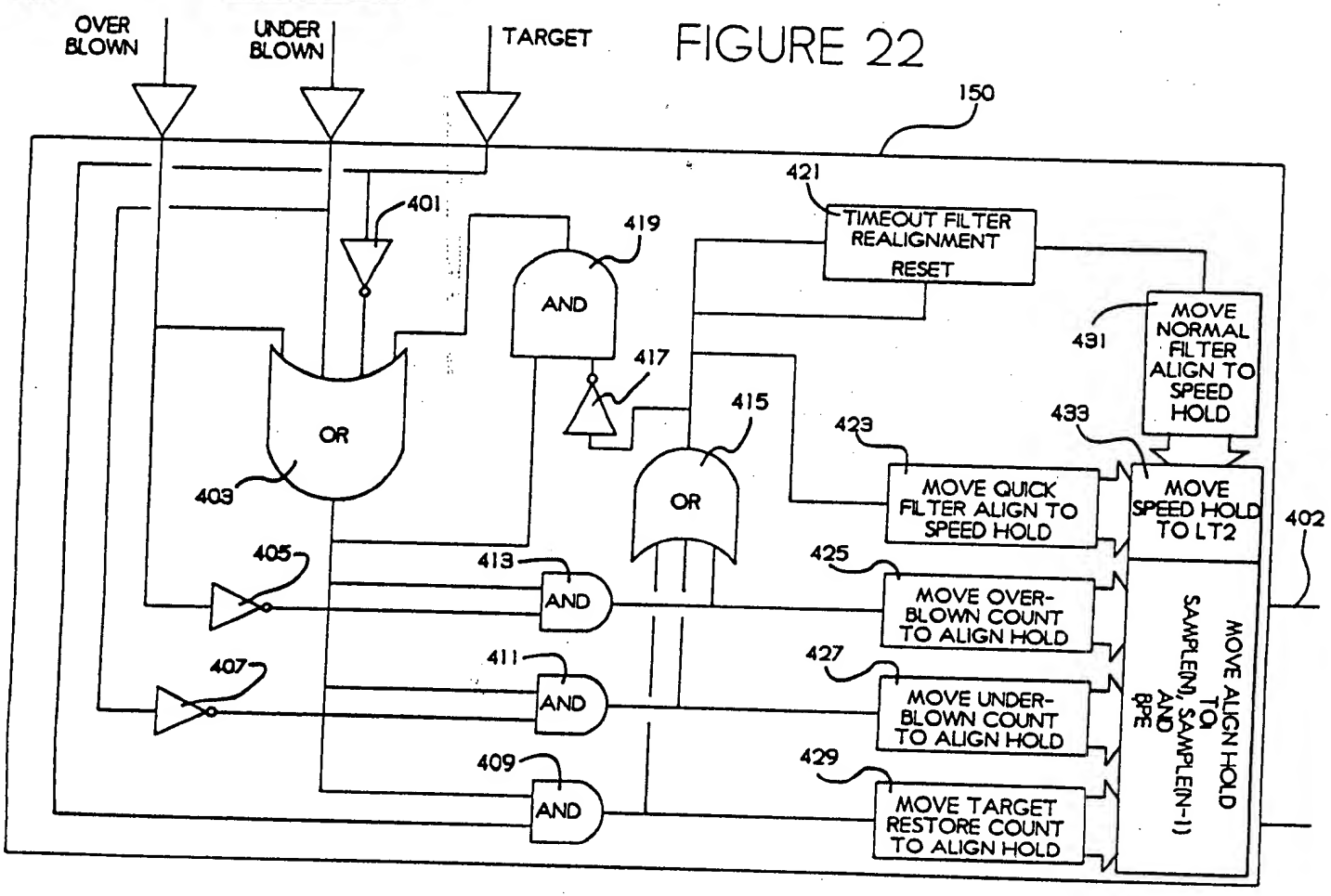

FROM
PI LOOP
159
READ PIOUT
(LOOP OUTPUT)
301
303
IS
PI OUTPUT
> MAXOUT
?
YES
305
PIOUT
=
MAXOUT
NO
WRITE CLAMPED
PIOUT TO
PROPORTIONAL
VALVE ANALOG
OUTPUT
307
TO
DIGITAL-TO-
ANALOG
CONVERTER

FIGURE 21

FIGURE 22


OVER BLOWN
UNDER BLOWN
TARGET
150
421
TIMEOUT FILTER REALIGNMENT RESET
401
419
AND
431
MOVE NORMAL FILTER ALIGN TO SPEED HOLD
417
415
OR
423
433
OR
403
MOVE QUICK FILTER ALIGN TO SPEED HOLD
MOVE SPEED HOLD TO LT2
402
405
413
AND
425
MOVE OVER-BLOWN COUNT TO ALIGN HOLD
407
411
AND
427
MOVE UNDER-BLOWN COUNT TO ALIGN HOLD
409
AND
429
MOVE TARGET RESTORE COUNT TO ALIGN HOLD
MOVE ALIGN HOLD TO SAMPLE(N), SAMPLE(N-1) AND BPE

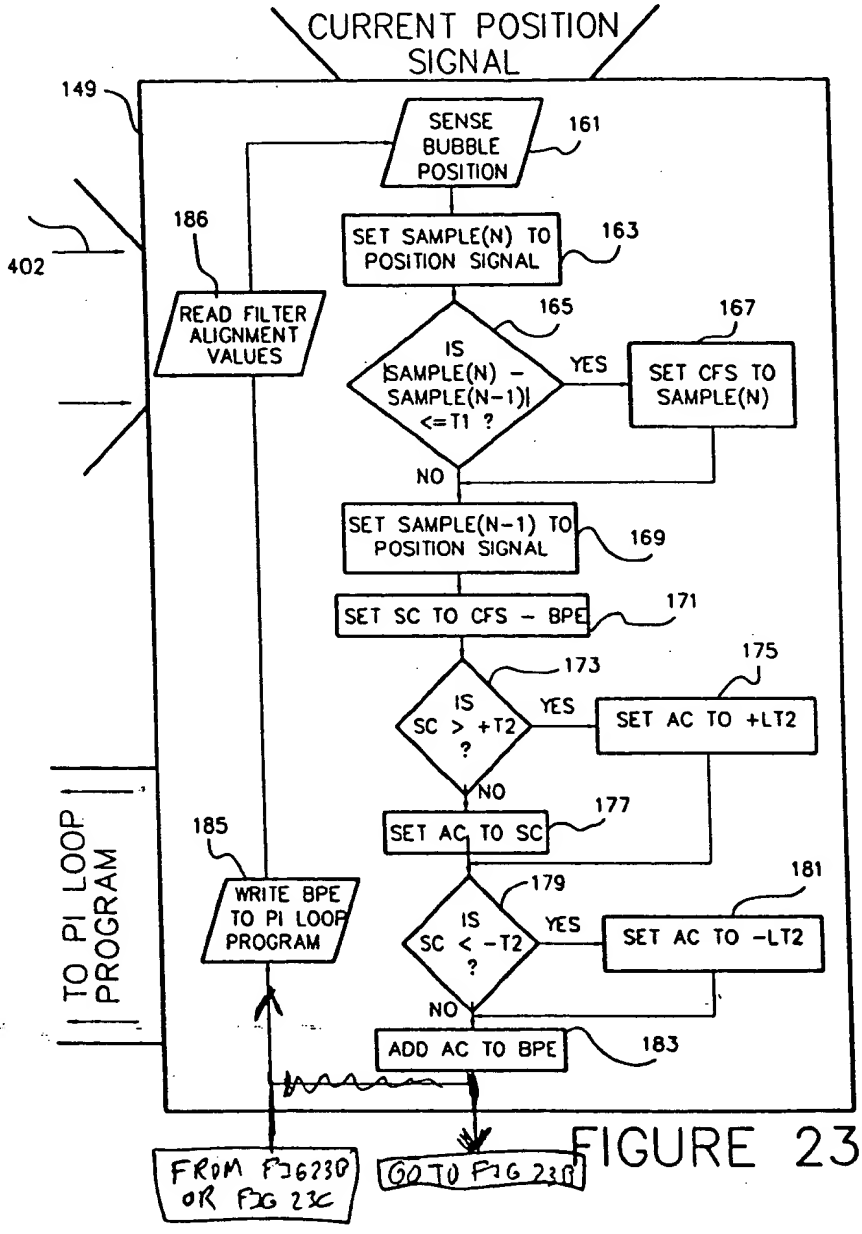

CURRENT POSITION SIGNAL
149
SENSE BUBBLE POSITION
161
186
SET SAMPLE(N) TO POSITION SIGNAL
163
402
READ FILTER ALIGNMENT VALUES
165
IS |SAMPLE(N) - SAMPLE(N-1)| <=T1 ?
YES
167
SET CFS TO SAMPLE(N)
NO
SET SAMPLE(N-1) TO POSITION SIGNAL
169
SET SC TO CFS - BPE
171
173
IS SC > +T2 ?
YES
175
SET AC TO +LT2
NO
SET AC TO SC
177
185
WRITE BPE TO PI LOOP PROGRAM
179
IS SC < -T2 ?
YES
181
SET AC TO -LT2
NO
ADD AC TO BPE
183
TO PI LOOP PROGRAM
FROM FIG 23B OR FIG 23C
GO TO FIG 23B

FIGURE 23A

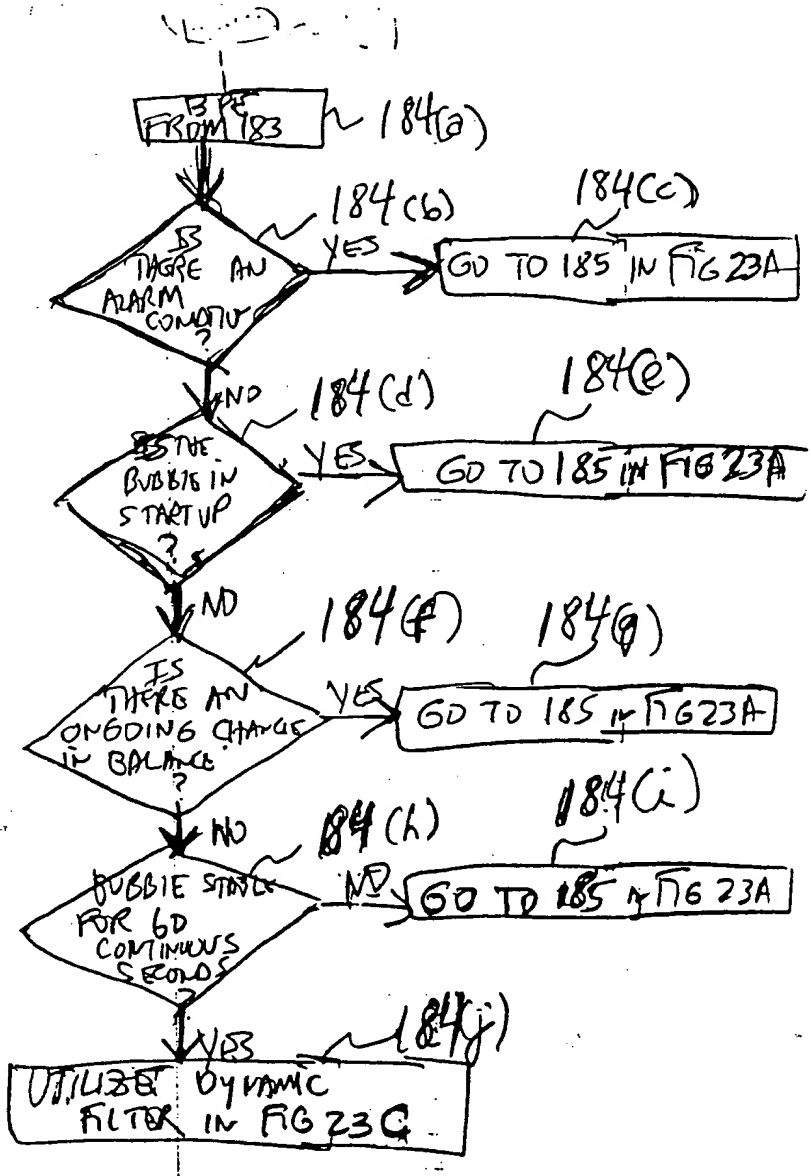

FROM 183
184(a)
IS THERE AN ALARM CONDITION ?
184(b)
YES
184(c)
GO TO 185 IN FIG 23A
NO
184(d)
IS THE BUBBLE IN START UP ?
YES
184(e)
GO TO 185 IN FIG 23A
NO
184(f)
IS THERE AN ONGOING CHANGE IN BALANCE ?
YES
184(g)
GO TO 185 IN FIG 23A
NO
184(h)
BUBBLE STABLE FOR 60 CONTINUOUS SECONDS ?
NO
184(i)
GO TO 185 IN FIG 23A
YES
184(j)
UTILIZE DYNAMIC FILTER IN FIG 23C

FIGURE 23B

T0660+0 "+8062360

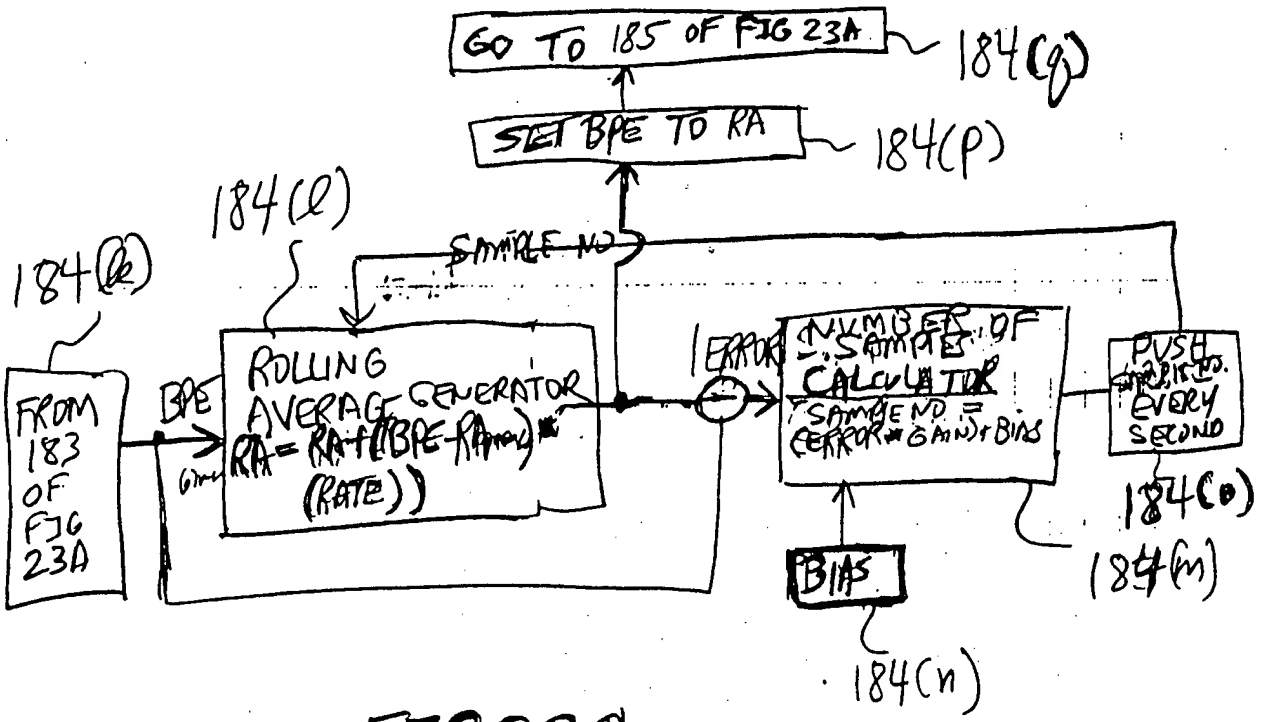


FIG 23C

TOSHAD +8065286

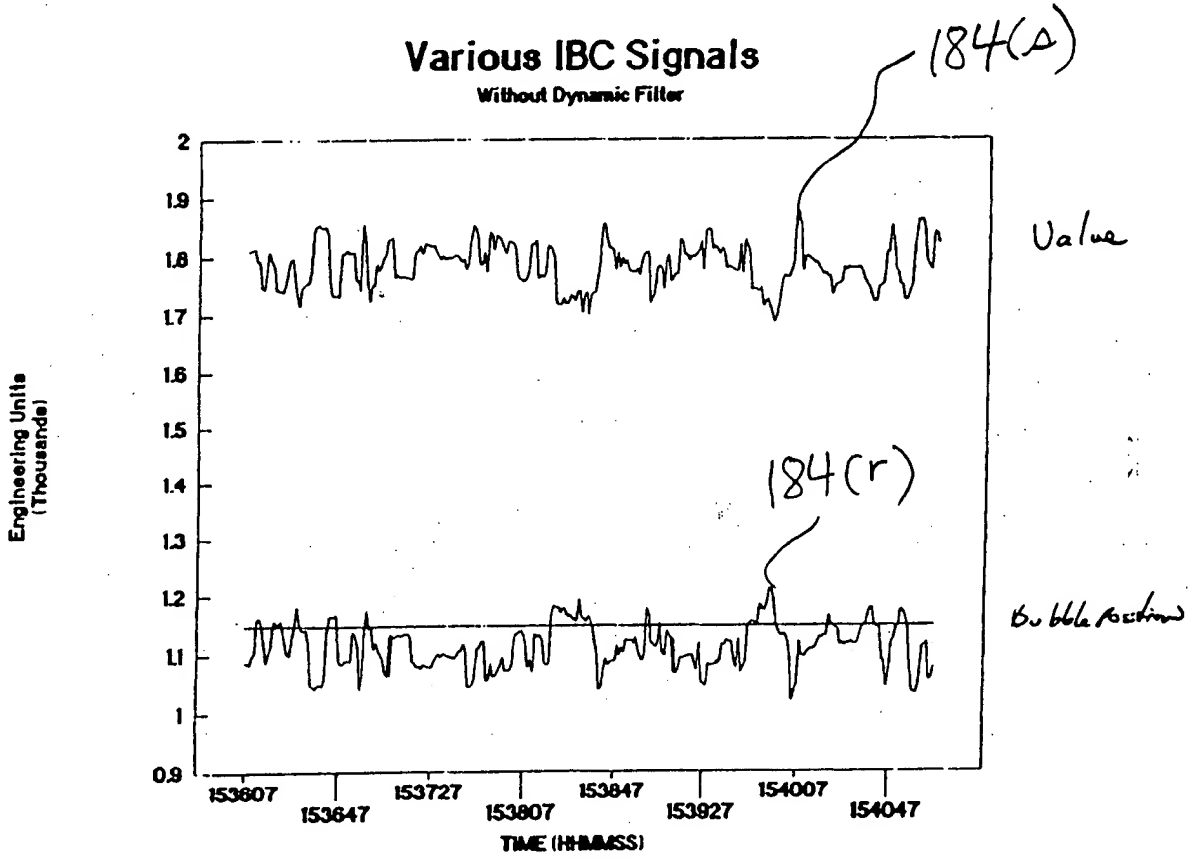


Figure 23D

TOSHIBA-MD02360

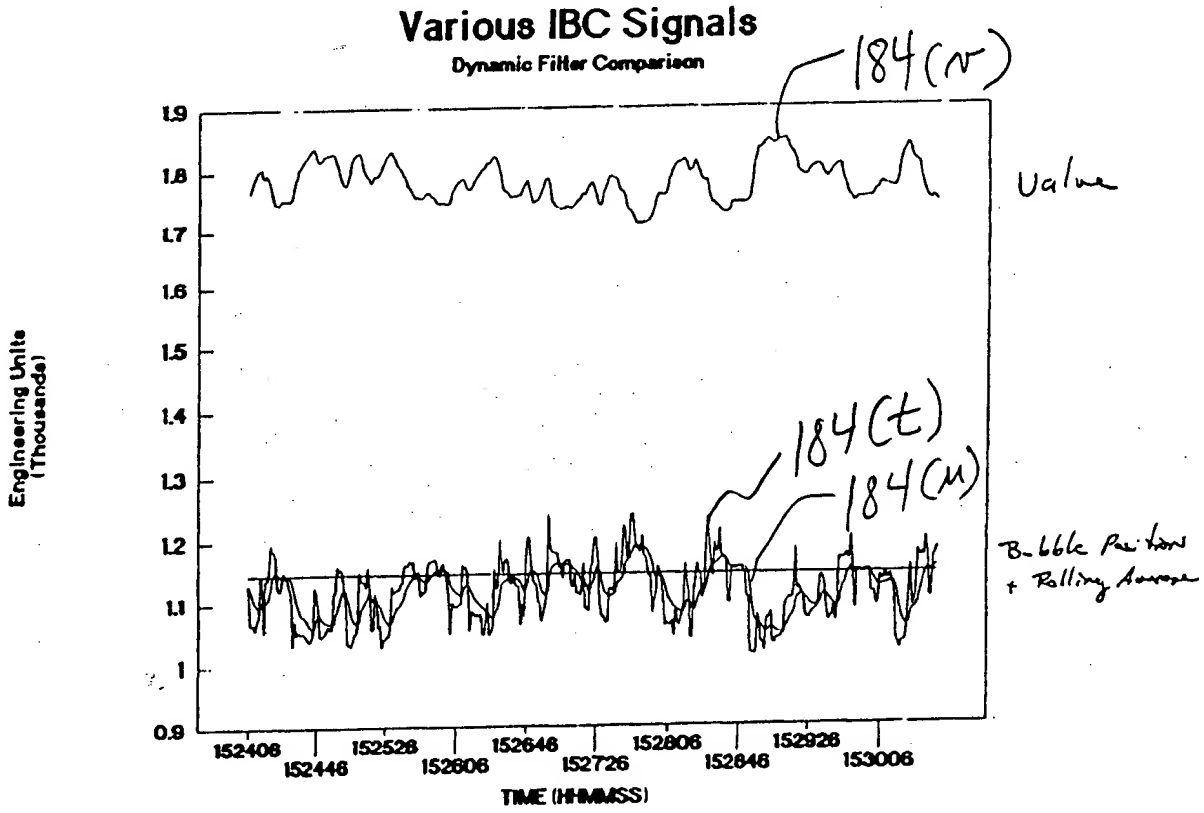


Figure 23E

T0809+0 "4806360

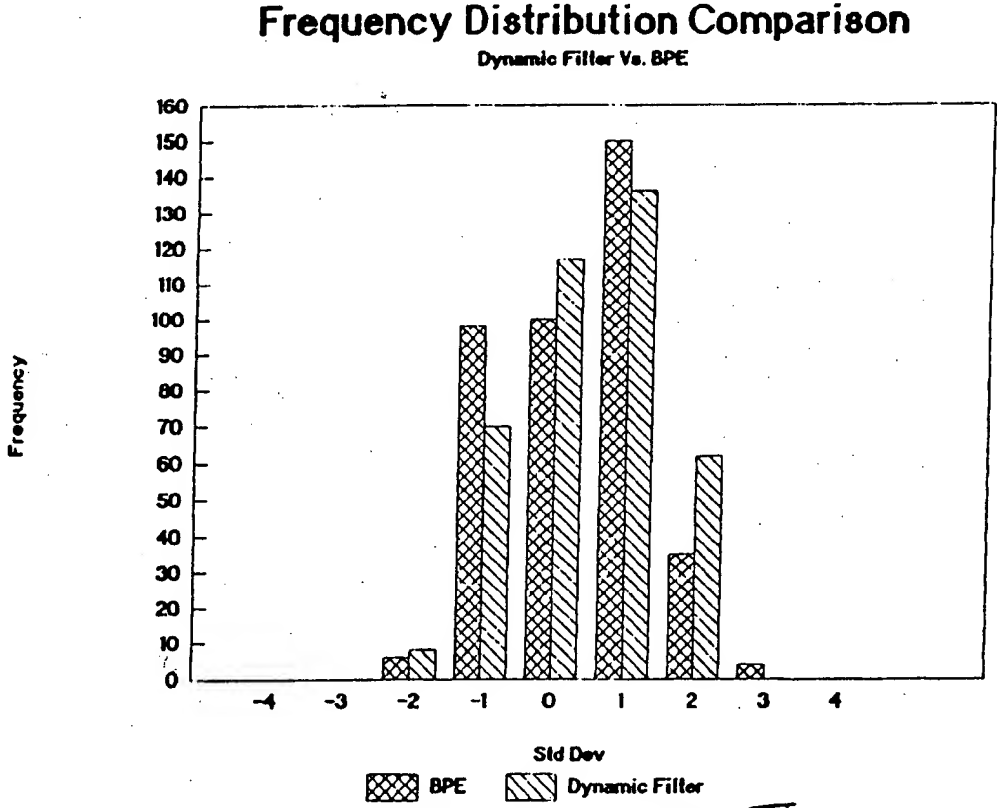


FIGURE 23F

Patent Application

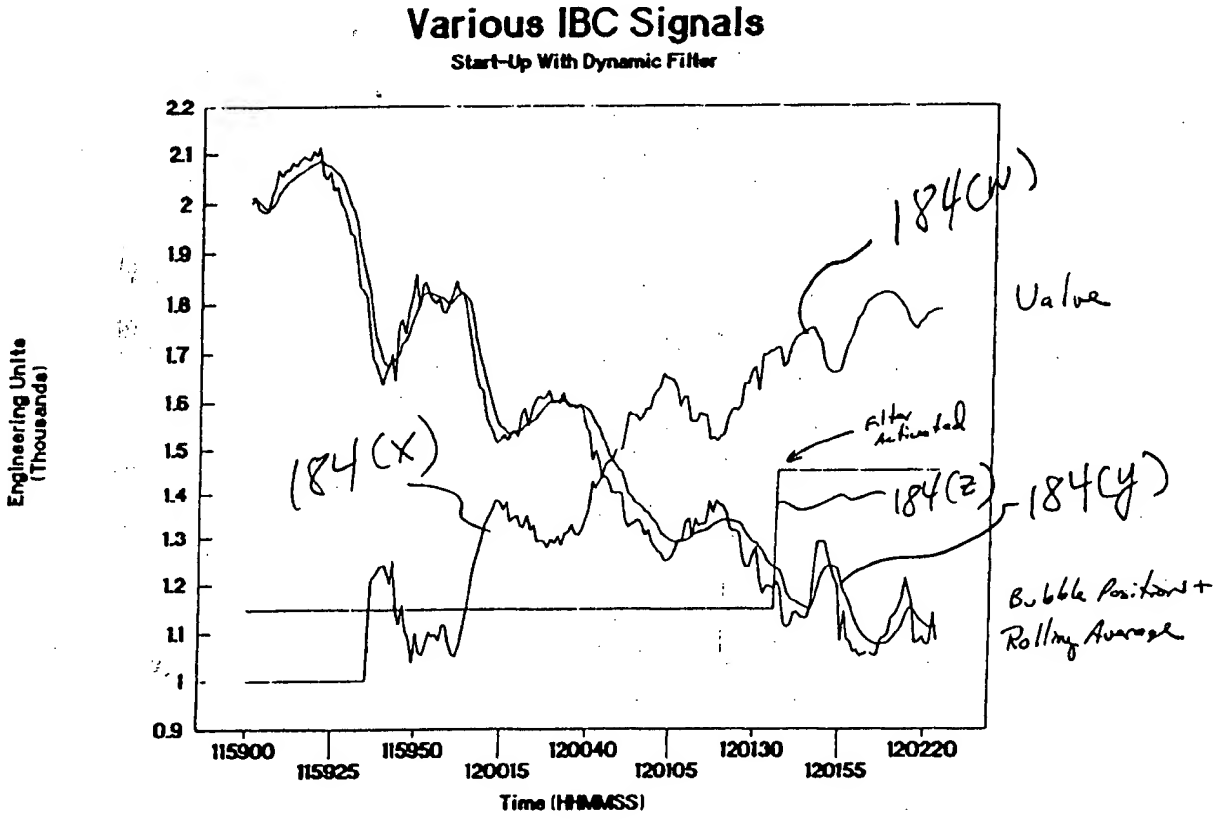


FIG 23G

Tasha Haasad

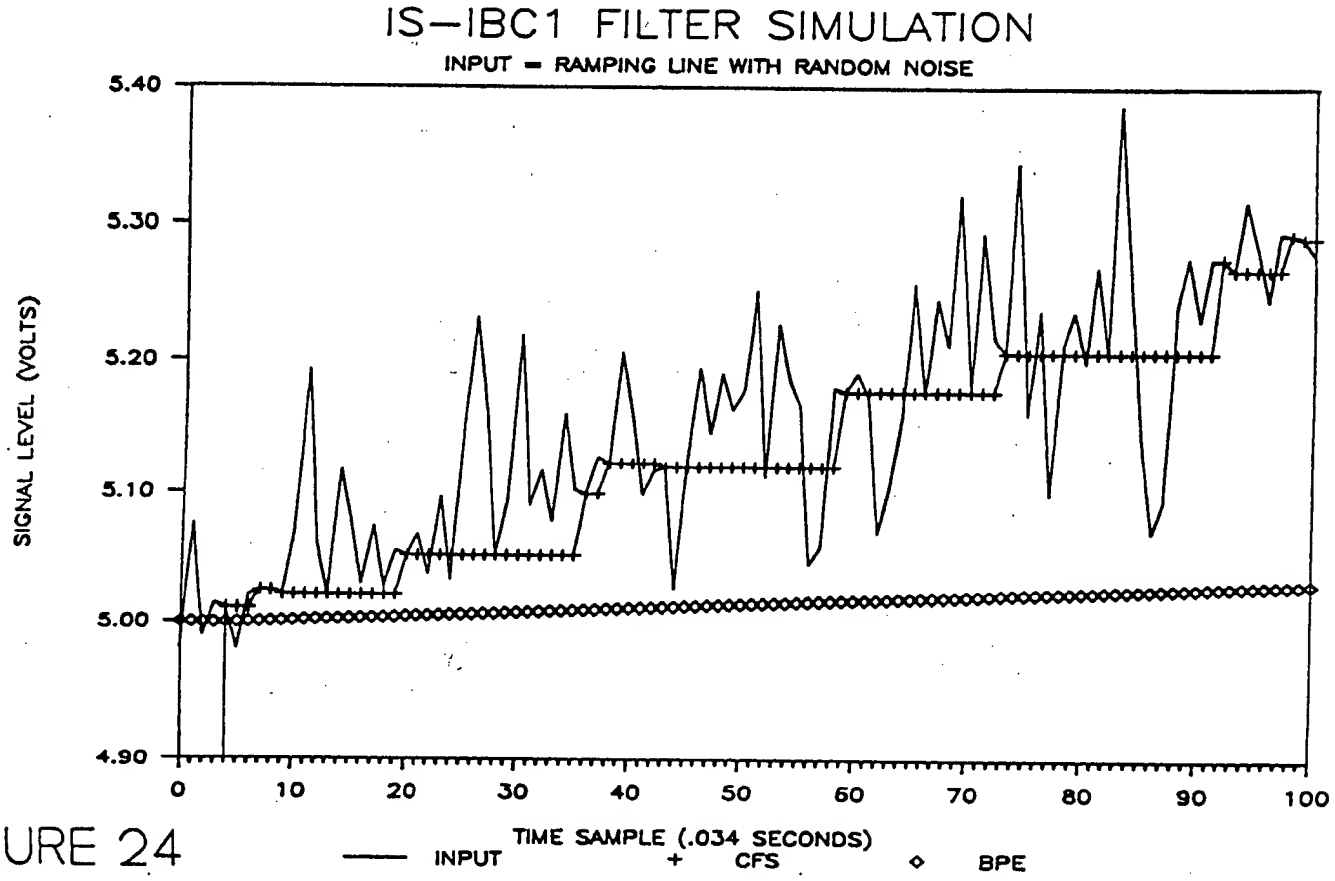
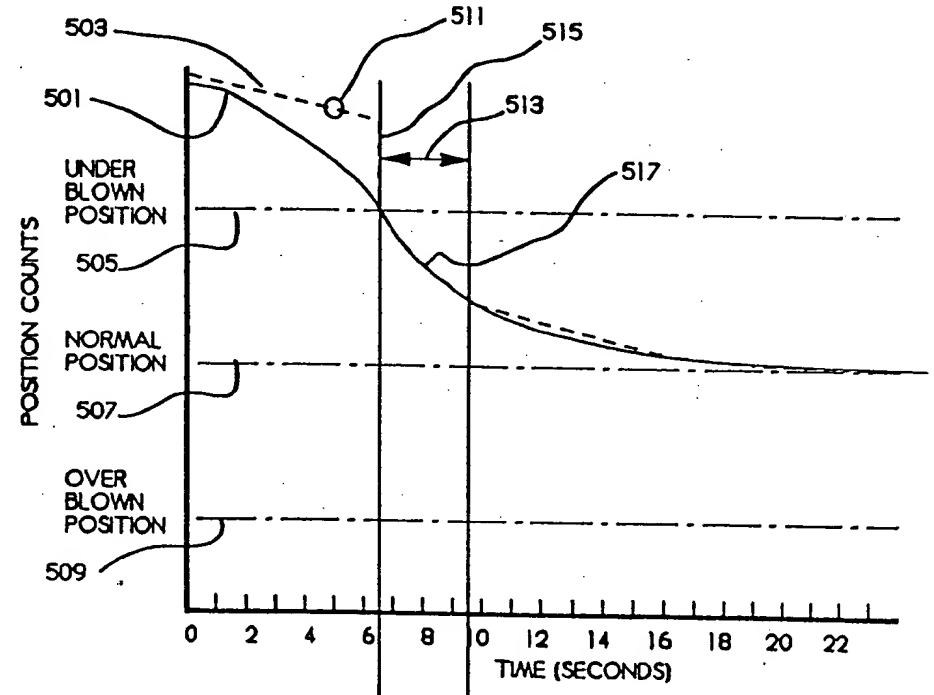


FIGURE 24

FIGURE 25A



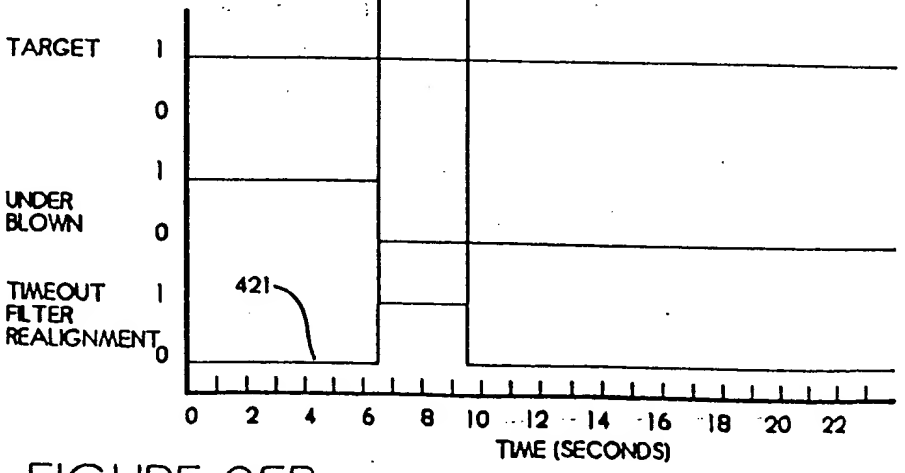


FIGURE 25B

FIGURE 26A

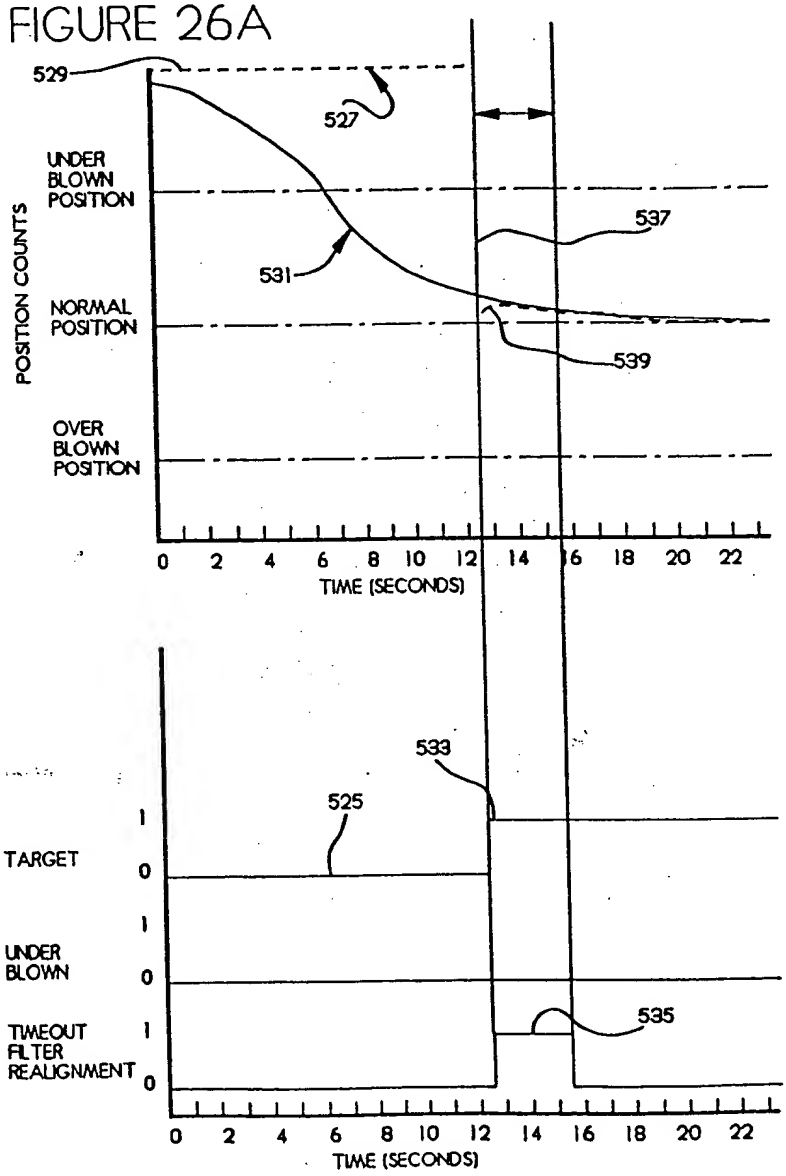
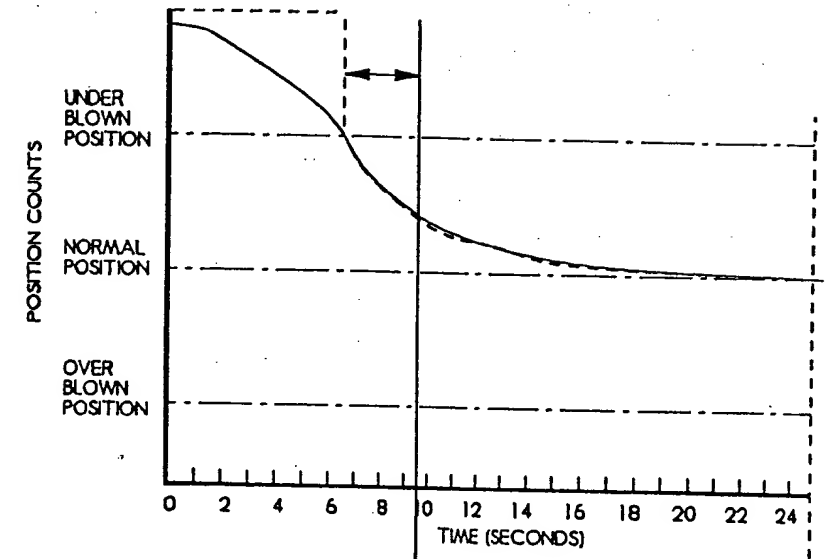


FIGURE 26B

FIGURE 27A



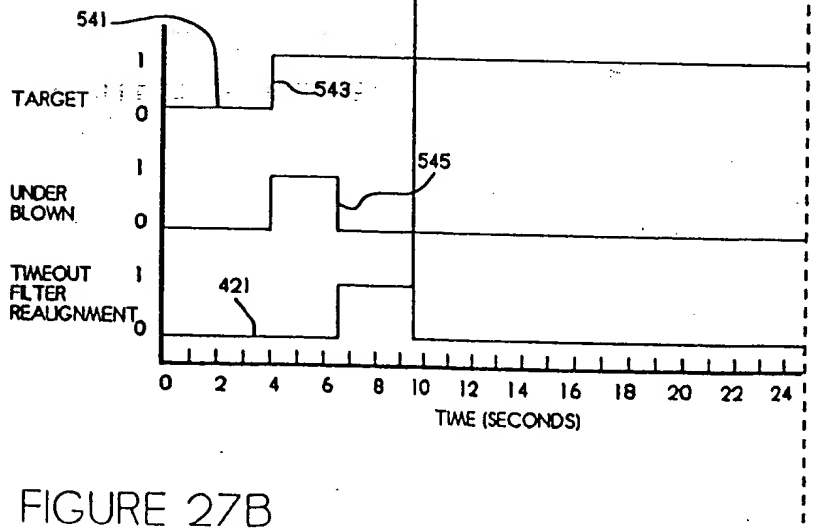


FIGURE 27B

T0604A* +80628G0

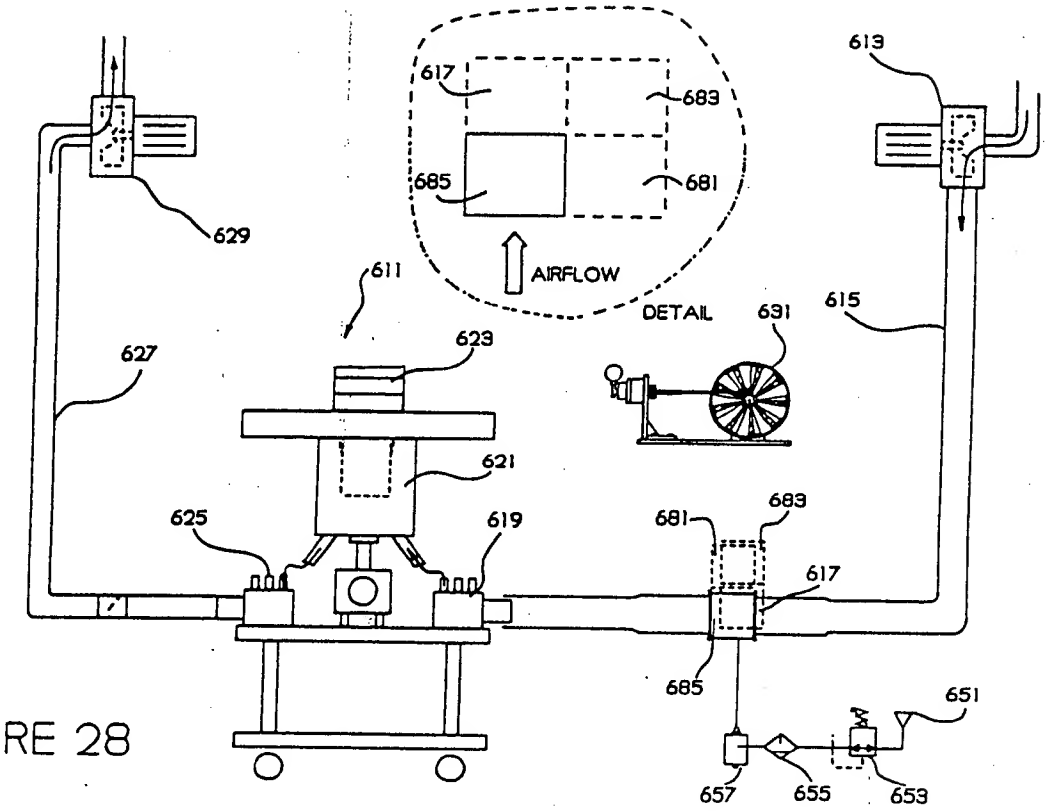


FIGURE 28

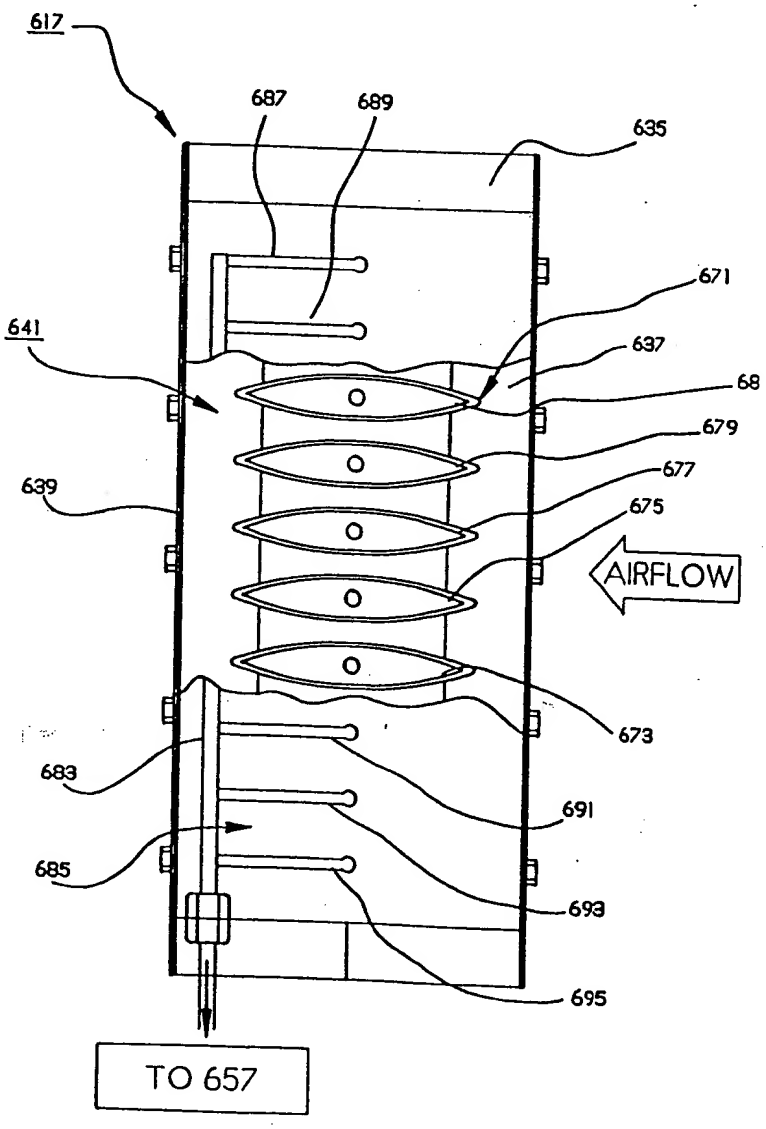

617
687
689
635
671
641
637
68
679
677
639
675
AIRFLOW
673
683
691
685
693
695
TO 657

FIGURE 29

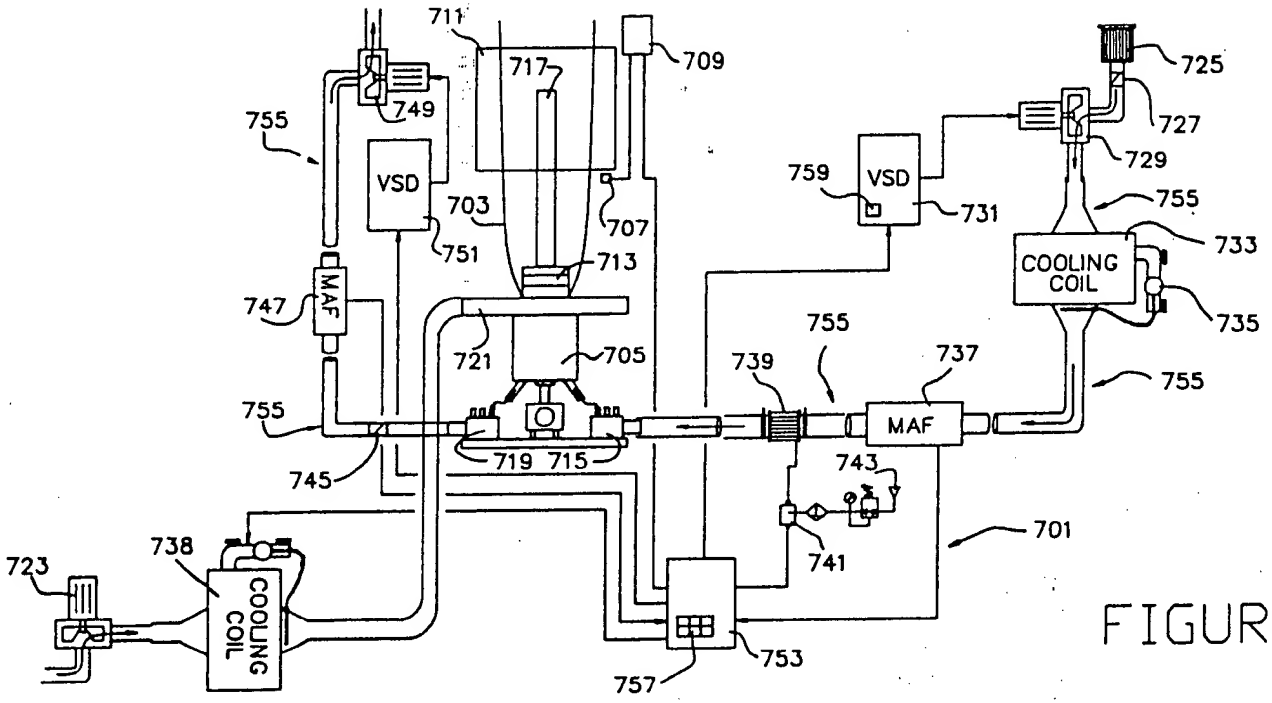

711
717
709
725
749
727
755
VSD
729
759
VSD
703
707
731
755
751
733
713
COOLING COIL
747
MAF
735
755
721
705
739
737
755
755
MAF
719 715
743
745
701
738
741
723
COOLING COIL
753
757

FIGURE 30

TOSHO-H0026860

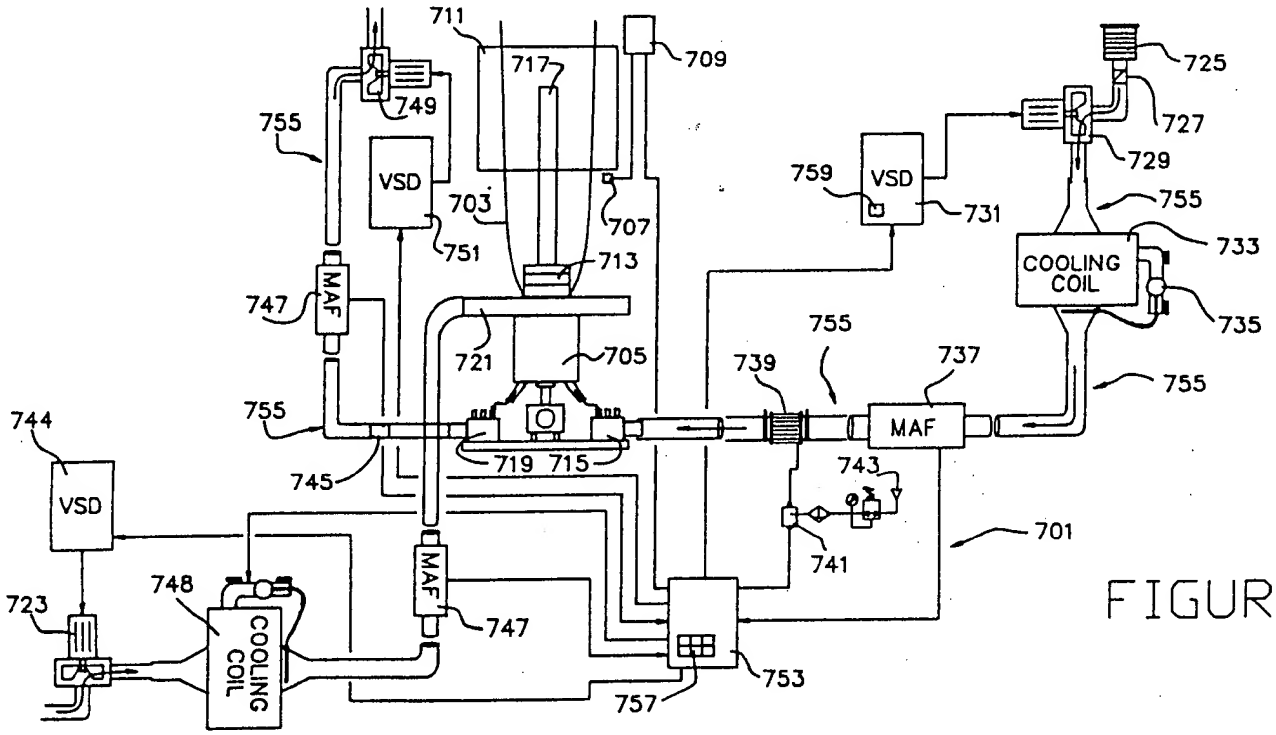


FIGURE 31

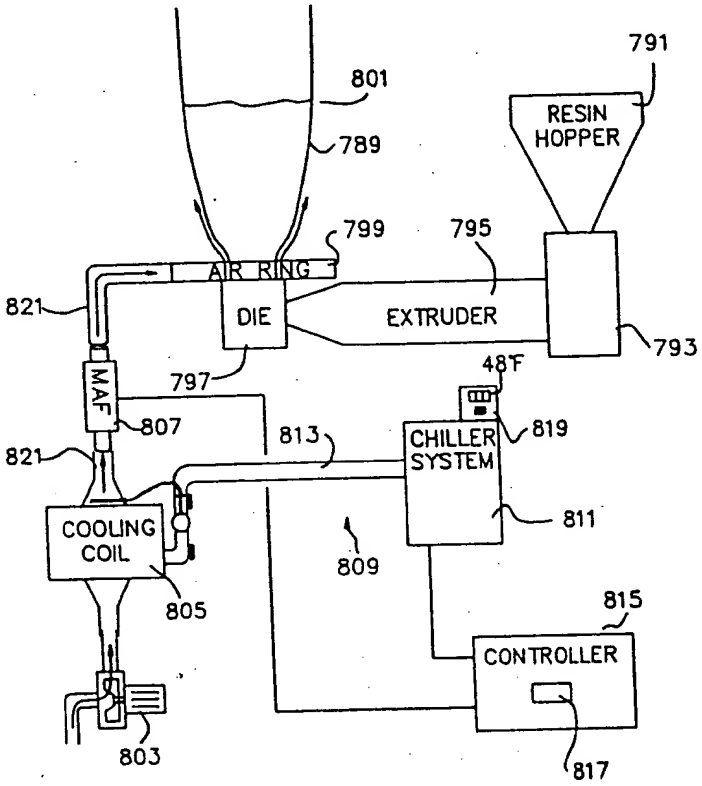

791
801
RESIN HOPPER
789
799
795
AIR RING
821
DIE
EXTRUDER
793
797
48F
MAF
807
813
CHILLER SYSTEM
819
821
811
COOLING COIL
809
805
815
CONTROLLER
803
817

FIGURE 32

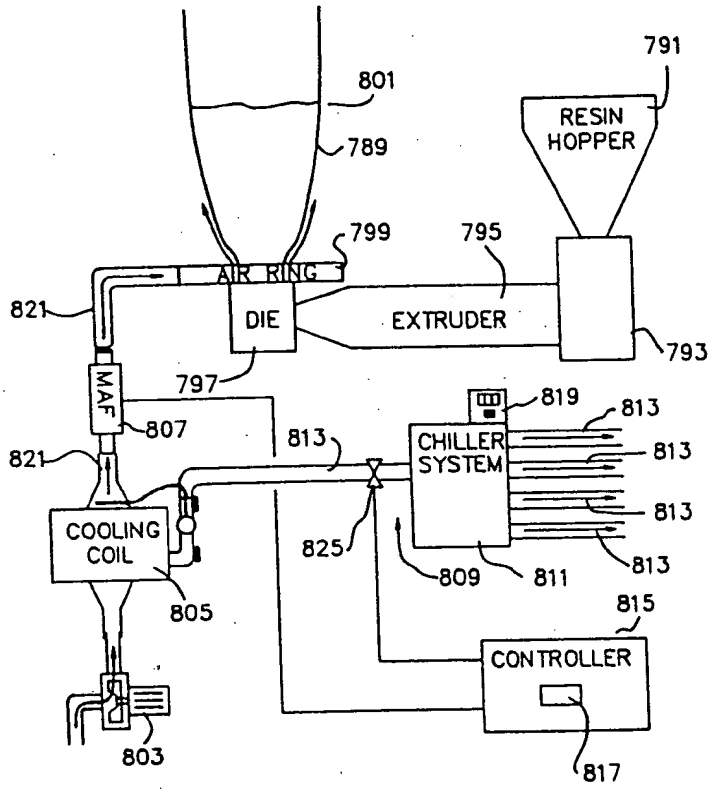

801
791
RESIN HOPPER
789
799
795
AIR RING
821
DIE
EXTRUDER
793
797
MAF
807
819
813
813
821
CHILLER SYSTEM
813
813
COOLING COIL
825
809
811
813
805
815
CONTROLLER
803
817

FIGURE 33

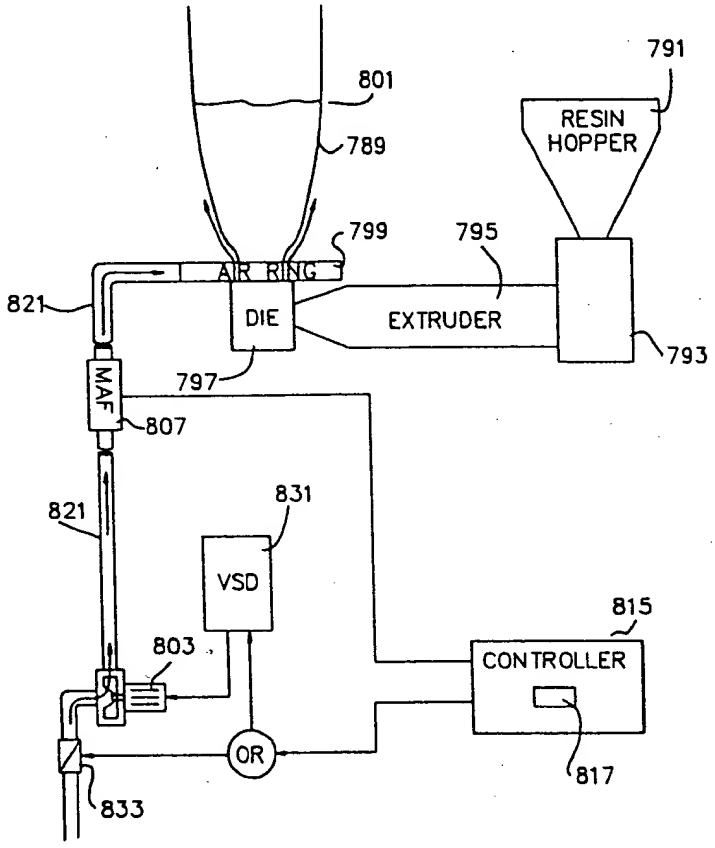

801
791
RESIN HOPPER
789
799
795
AIR RING
821
DIE
EXTRUDER
793
797
MAF
807
831
821
VSD
815
803
CONTROLLER
OR
817
833

FIGURE 34

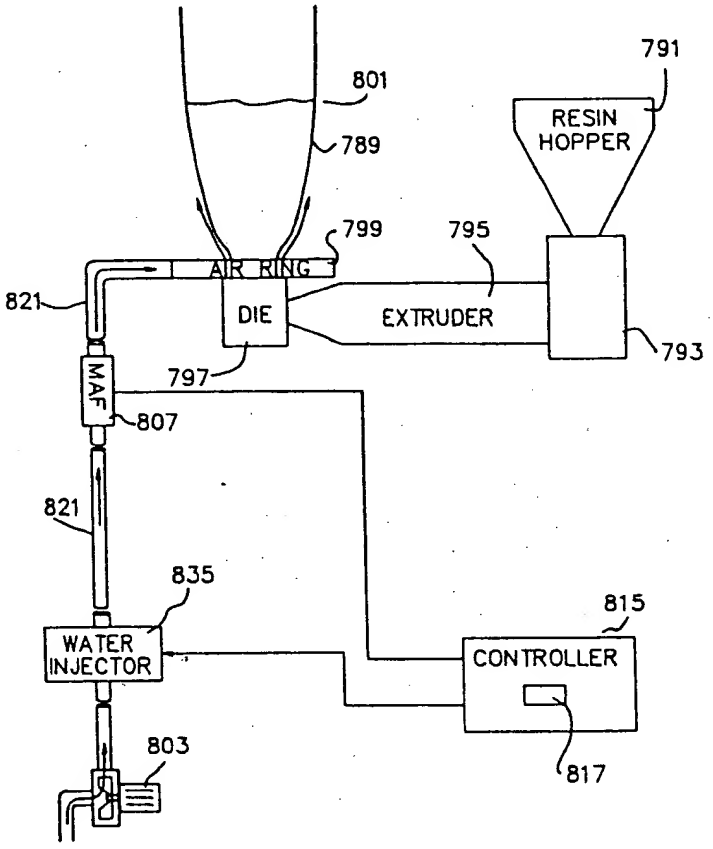

801
791
RESIN HOPPER
789
799
795
AIR RING
821
DIE
EXTRUDER
793
797
MAF
807
821
835
815
WATER INJECTOR
CONTROLLER
803
817

FIGURE 35

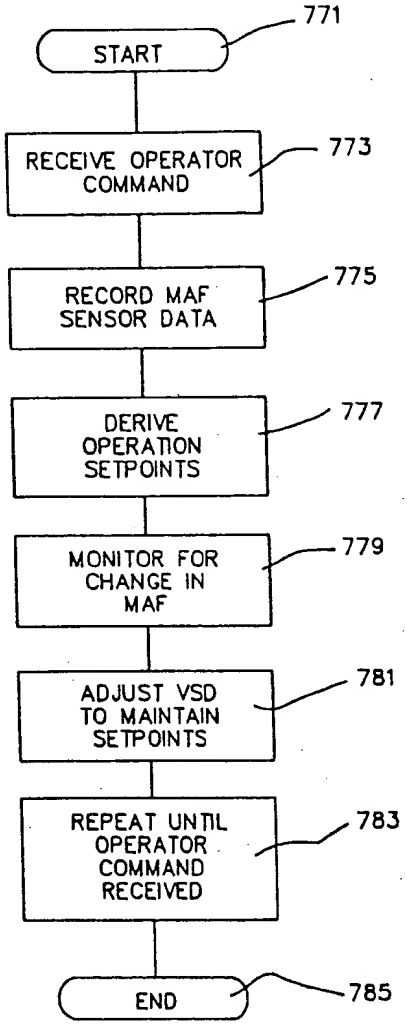

771
START
RECEIVE OPERATOR COMMAND
773
RECORD MAF SENSOR DATA
775
DERIVE OPERATION SETPOINTS
777
MONITOR FOR CHANGE IN MAF
779
ADJUST VSD TO MAINTAIN SETPOINTS
781
REPEAT UNTIL OPERATOR COMMAND RECEIVED
783
END
785

FIGURE 36

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

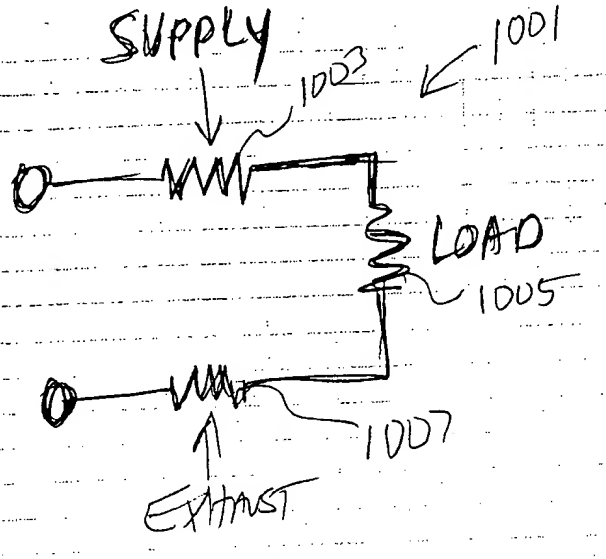


FIGURE 37A
(PRIOR ART)

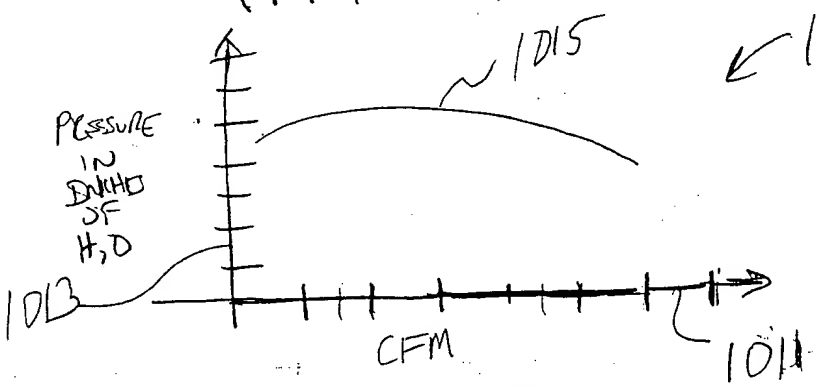


FIGURE 37B
(PRIOR ART)

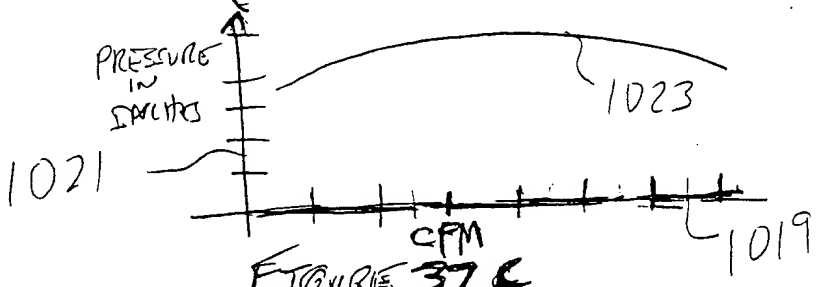


FIGURE 37C
(PRIOR ART)

ATTORNEYS

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

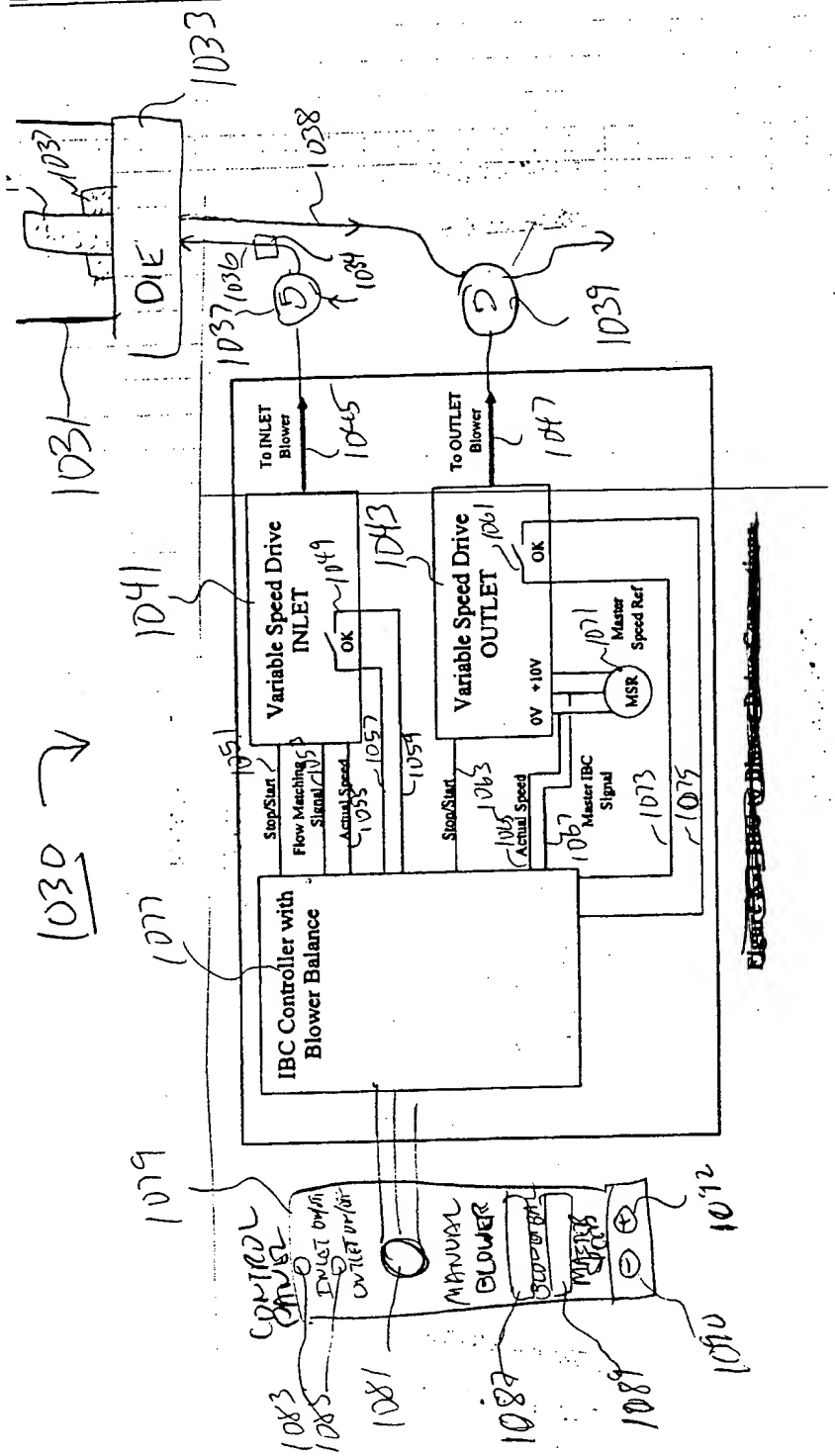


FIGURE 37D

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

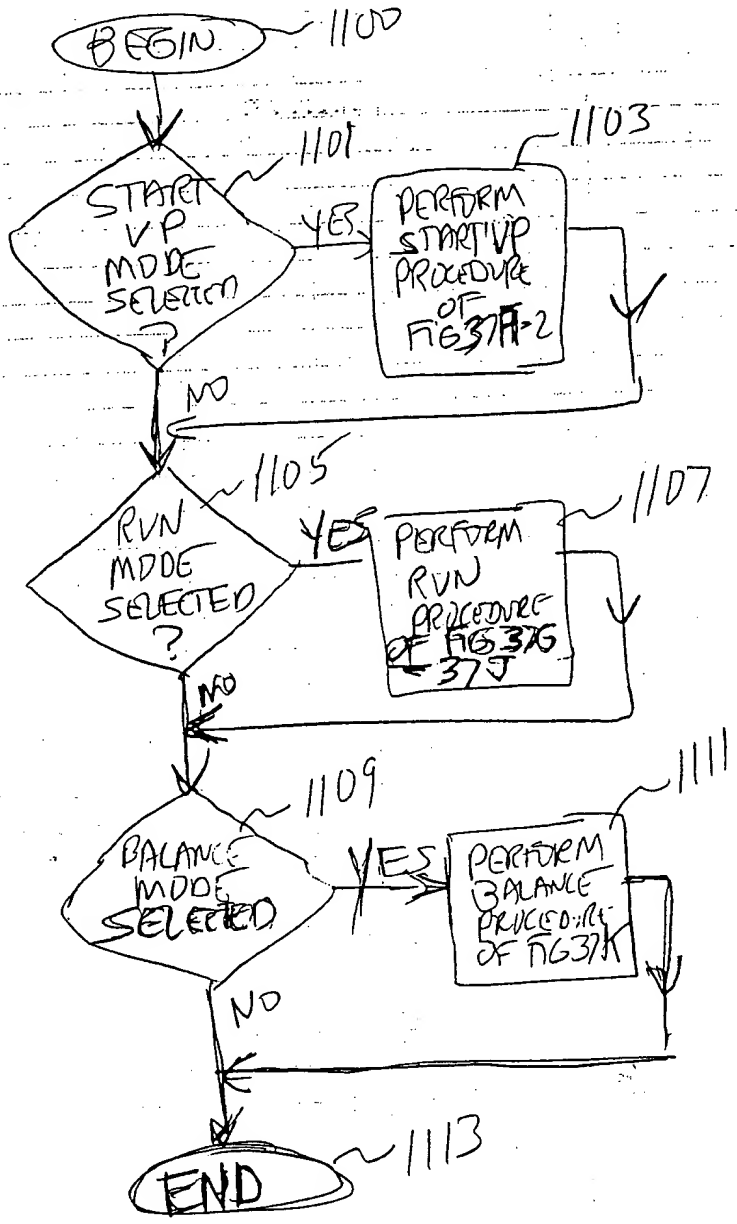


FIGURE 37E

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

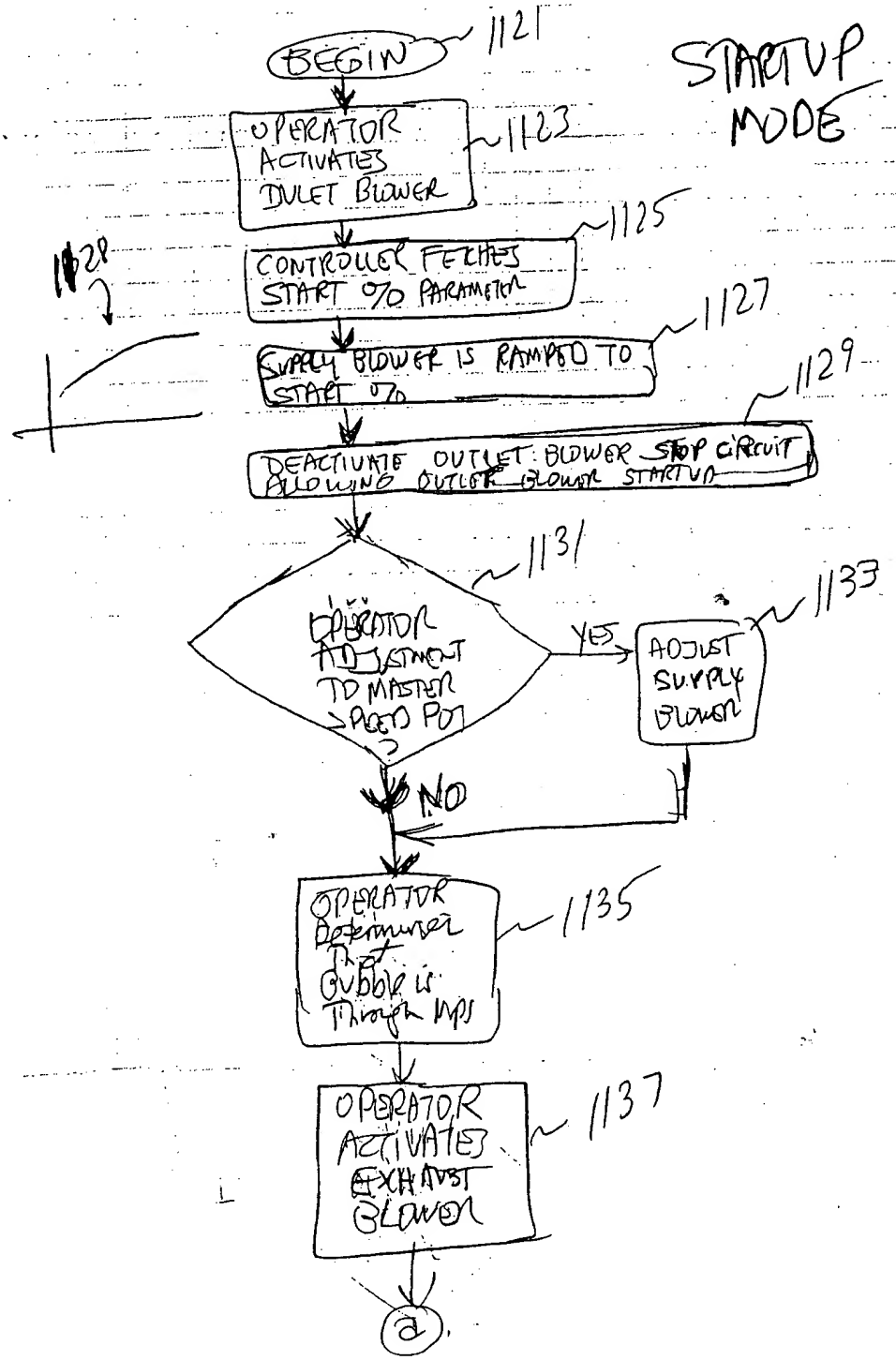


FIG 37 F1

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

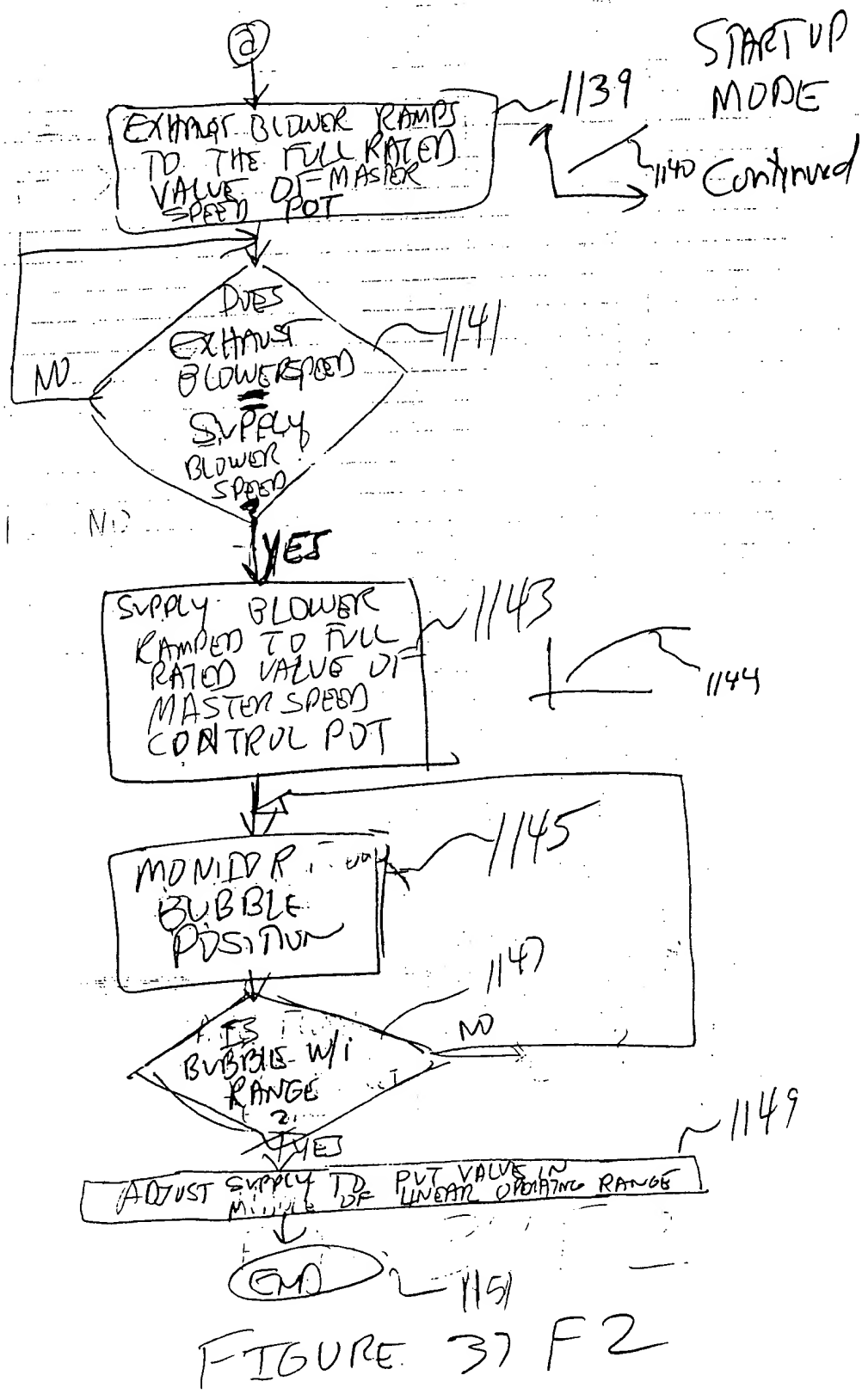


FIGURE 37 F2

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

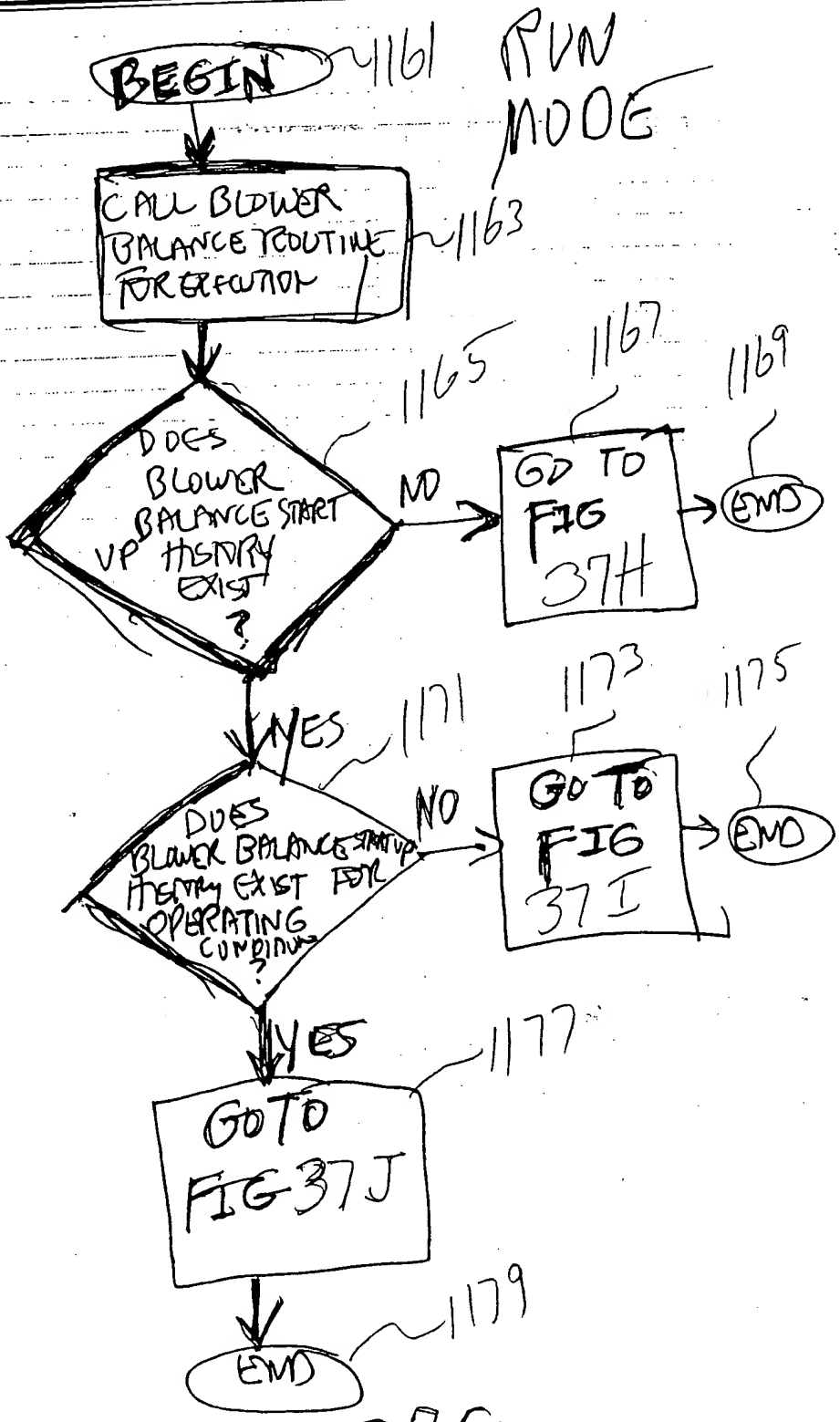


FIGURE 37G

ATTORNEYS

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

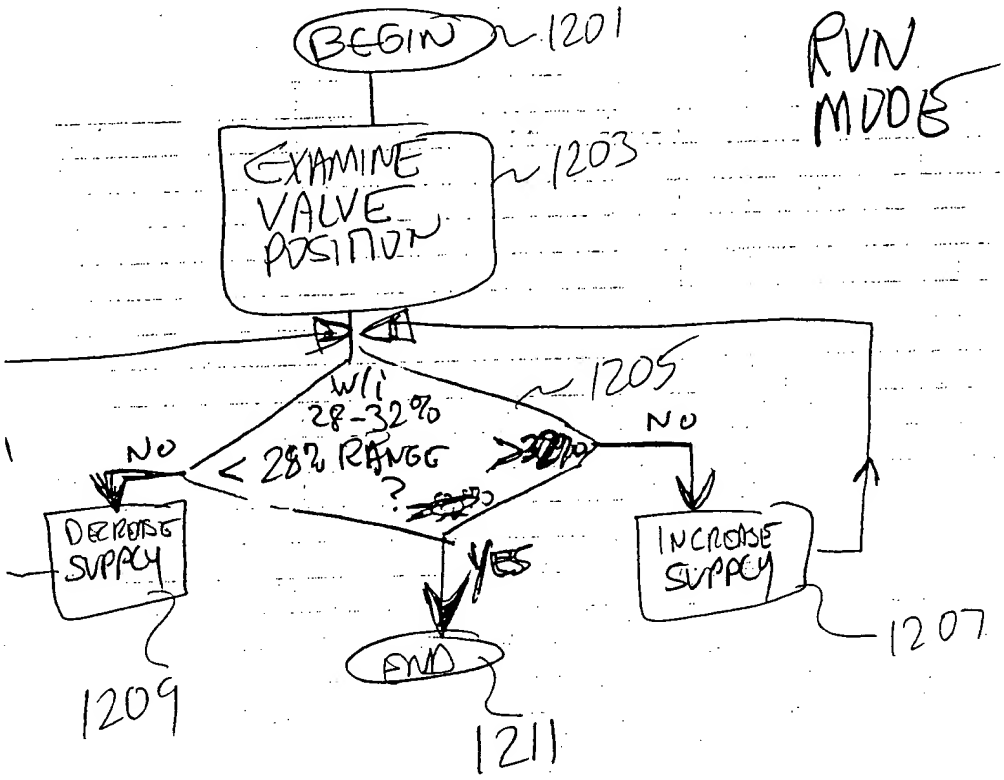


FIGURE 3TH

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

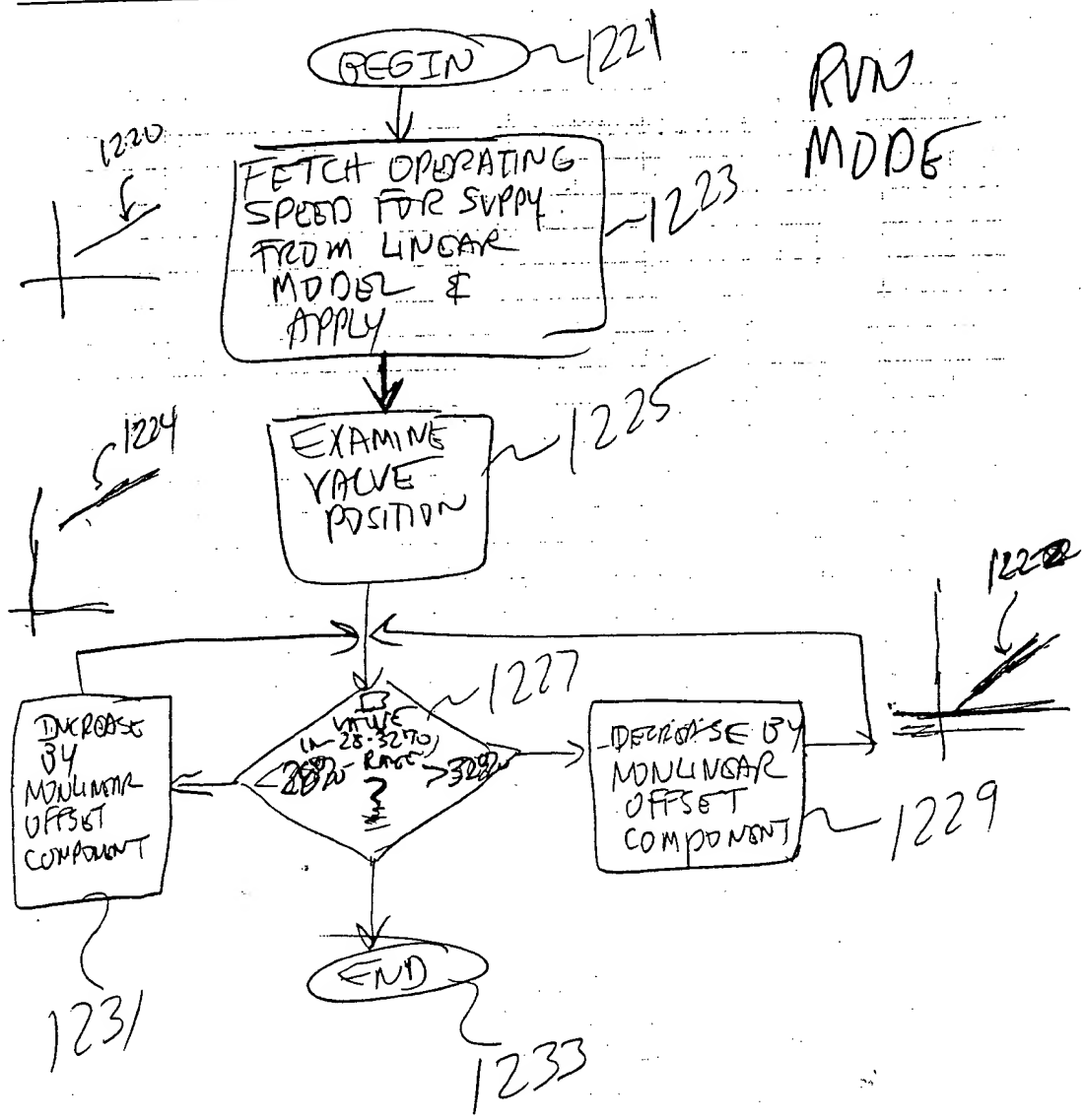


FIGURE 37I

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

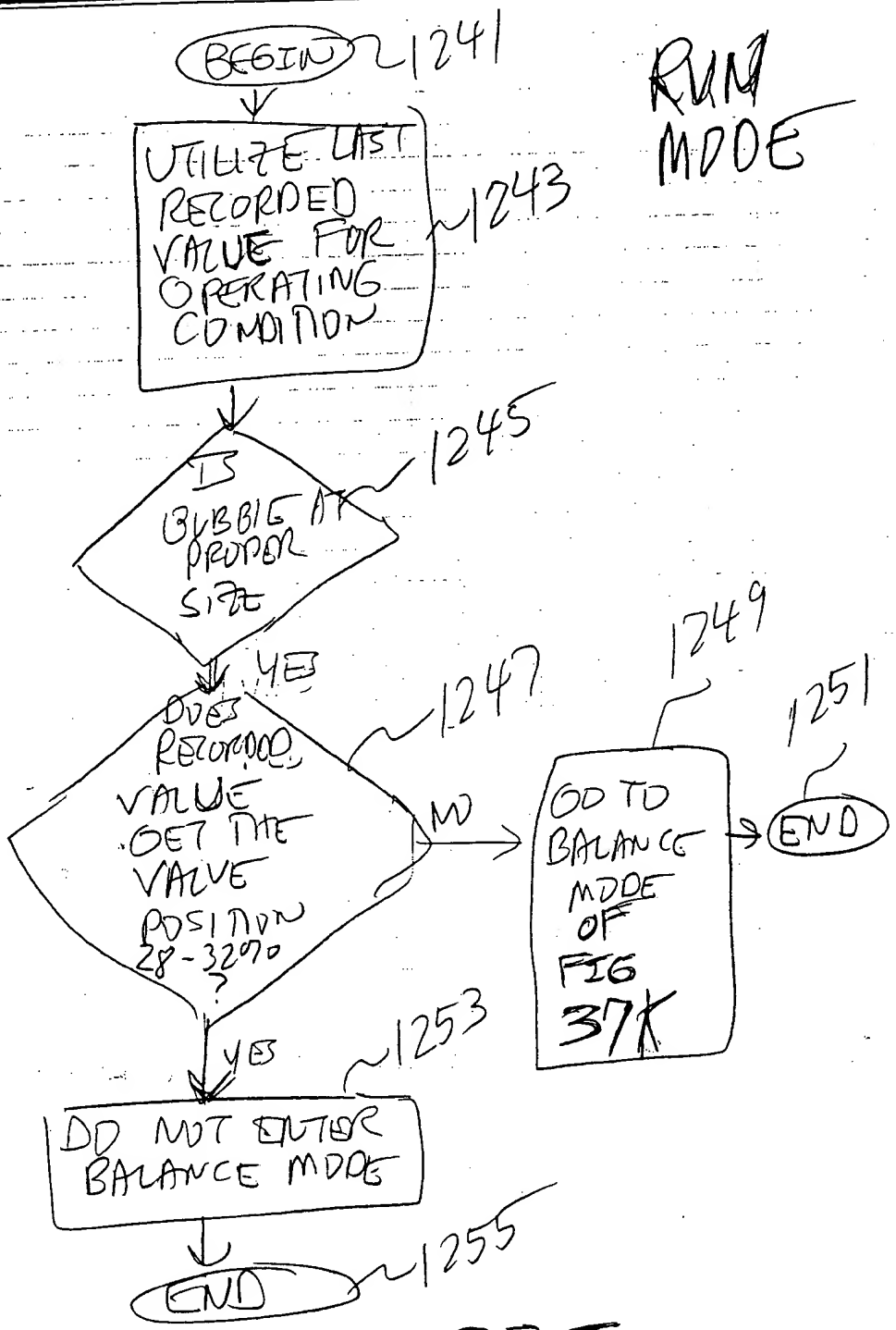


FIGURE 37J

PATENT SKETCH FORM

Attorney _____

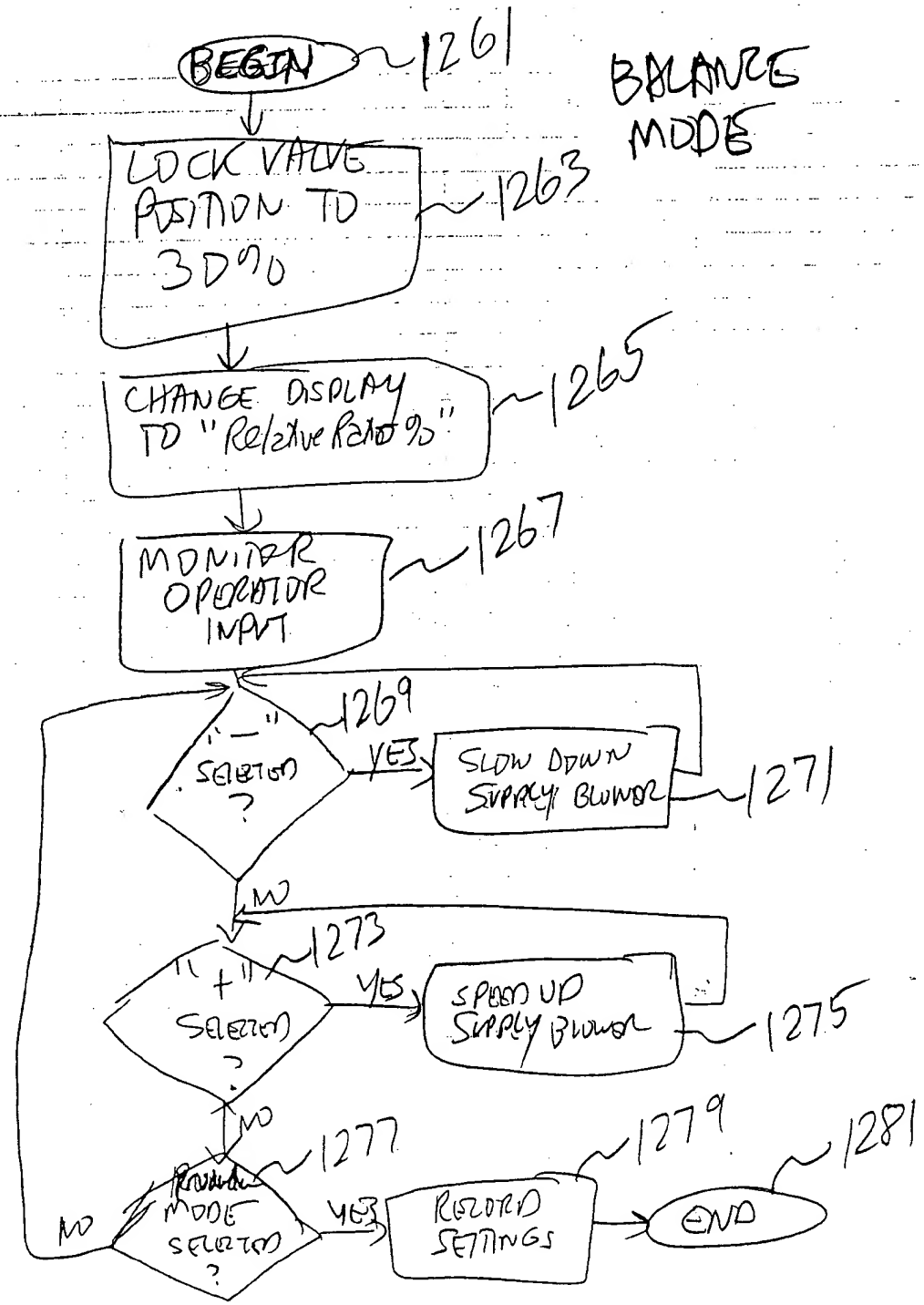


FIGURE 37K

ATTORNEYS

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

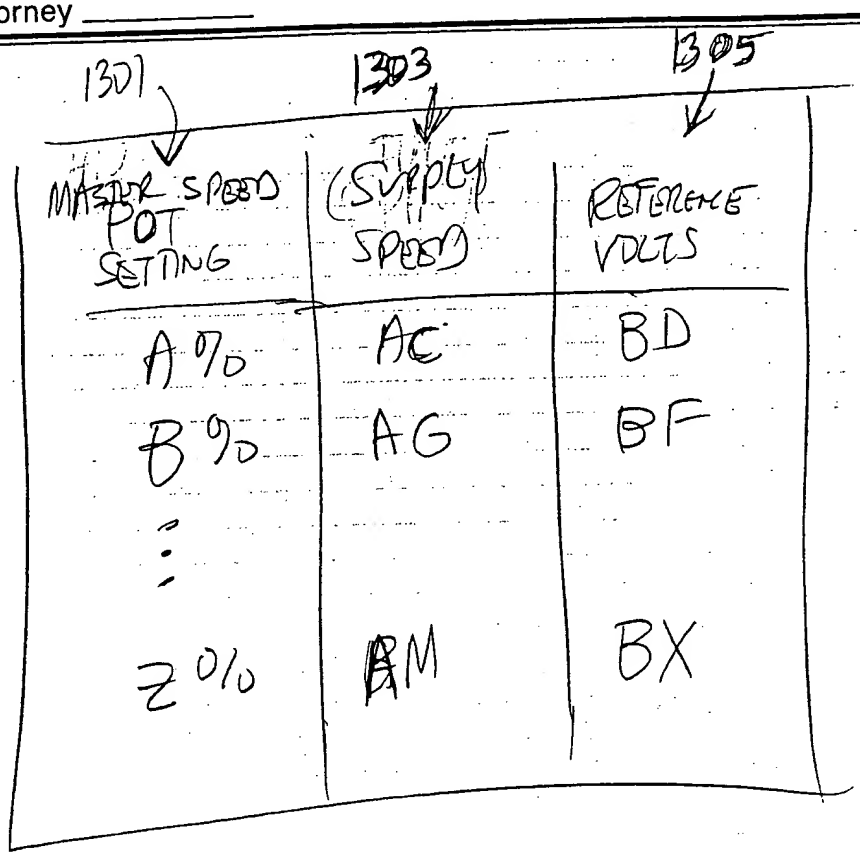


FIGURE 37L

FELSMAN, BRADLEY, GUNTER & DILLON
ATTORNEYS

Client _____
File No. _____
Sheet No. ____ of ____

PATENT SKETCH FORM

Attorney _____

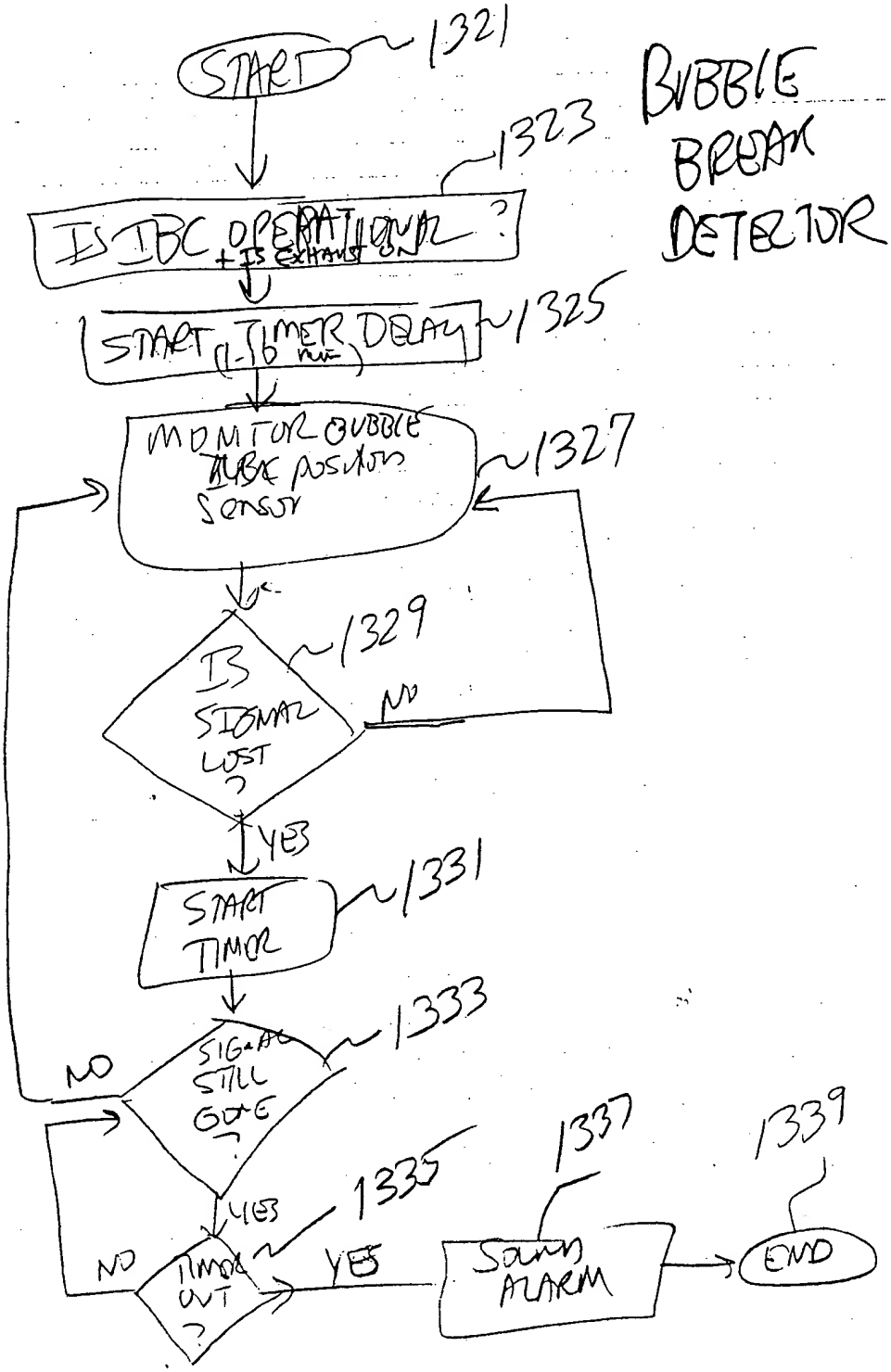


FIGURE 37M

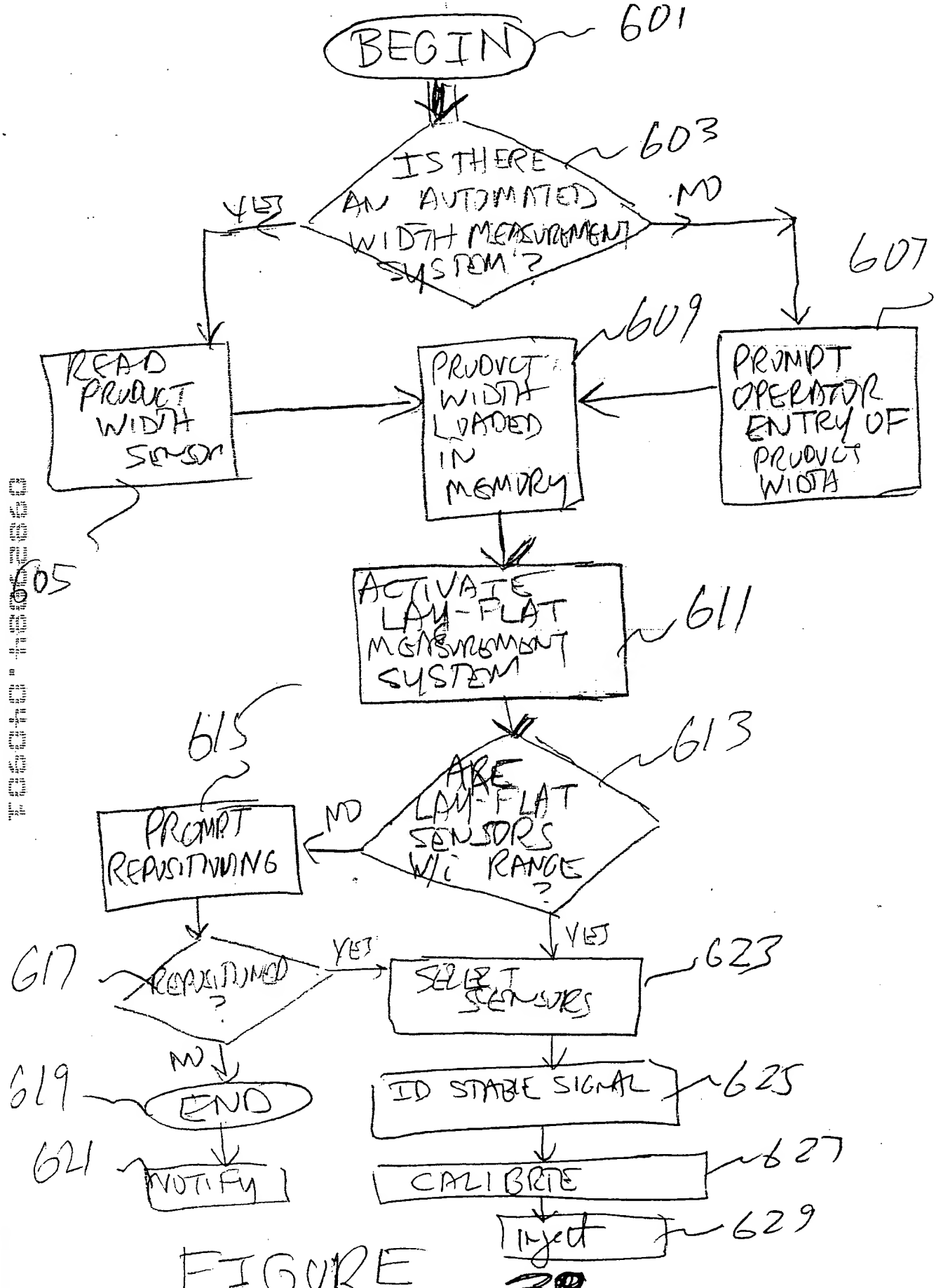

BEGIN
601
IS THERE AN AUTOMATED WIDTH MEASUREMENT SYSTEM?
603
YES
NO
READ PRODUCT WIDTH SENSOR
605
PRODUCT WIDTH LOADED IN MEMORY
609
PROMPT OPERATOR ENTRY OF PRODUCT WIDTH
607
ACTIVATE LAY-FLAT MEASUREMENT SYSTEM
611
ARE LAY-FLAT SENSORS W/ RANGE?
613
NO
PROMPT REPOSITIONING
615
YES
REPOSITIONED?
617
YES
NO
END
619
NOTIFY
621
SELECT SENSORS
623
ID STABLE SIGNAL
625
CALIBRATE
627
Inject
629

FIGURE 38

TOSHO "1806280

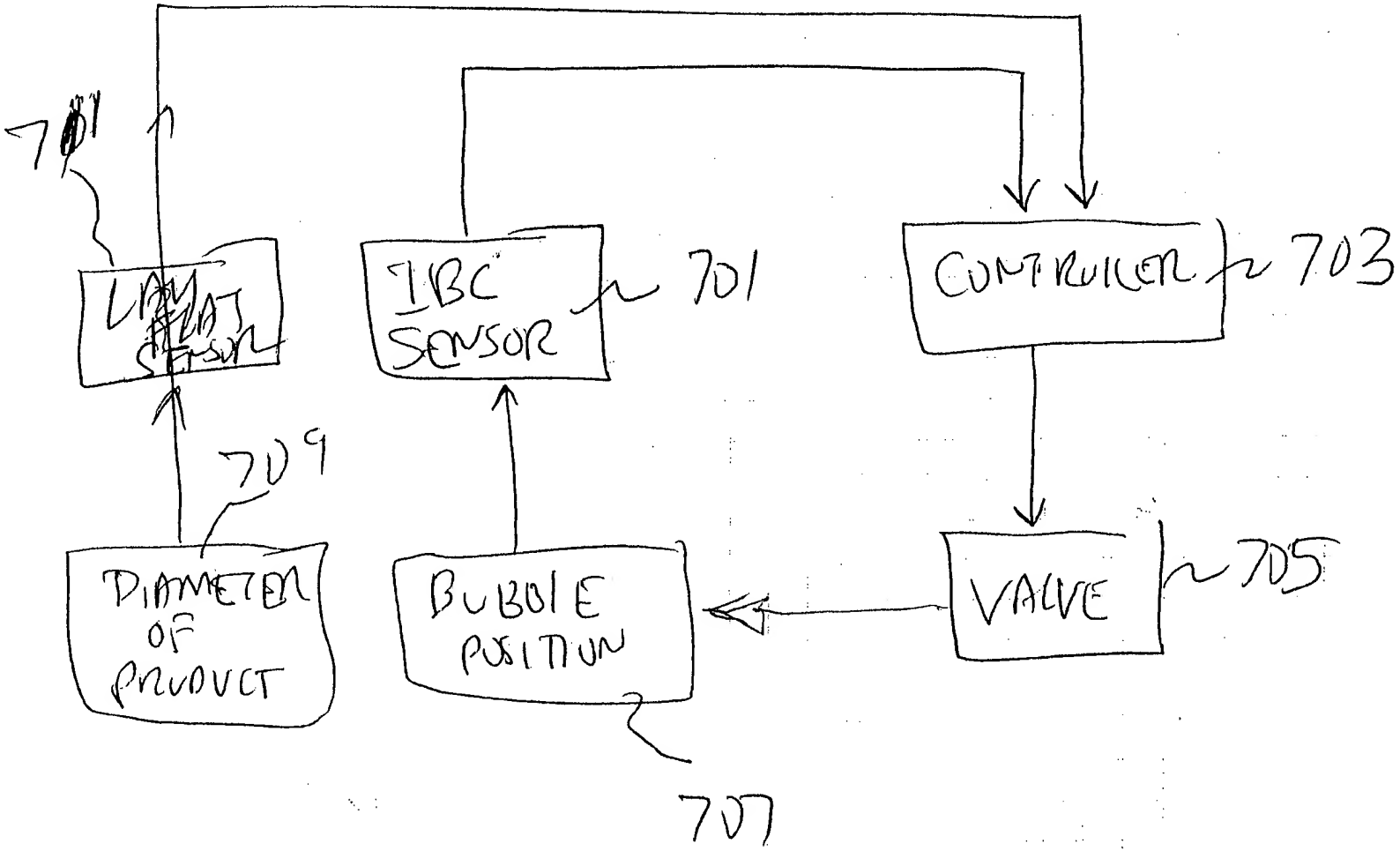


FIGURE 39

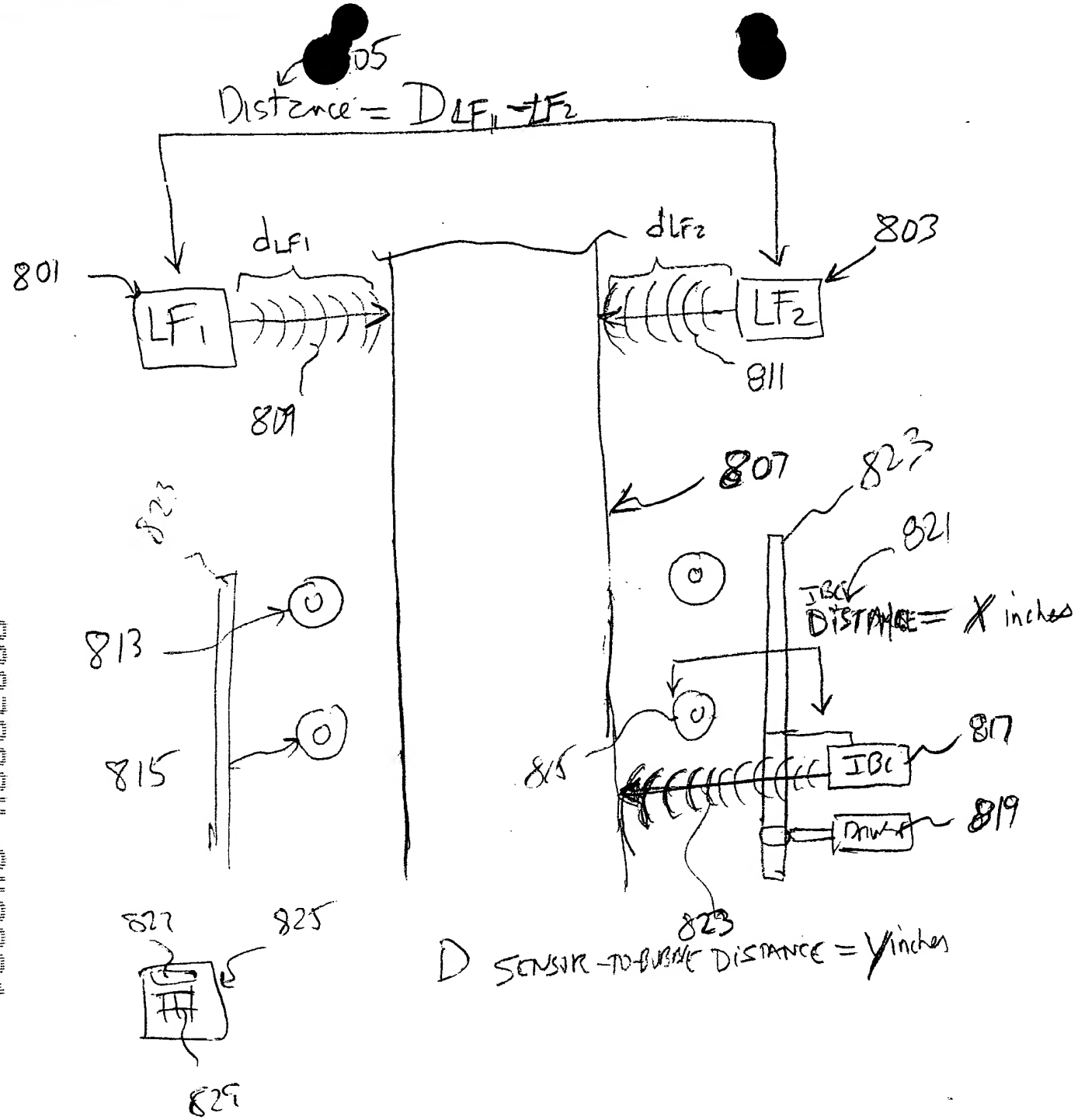


FIGURE 40

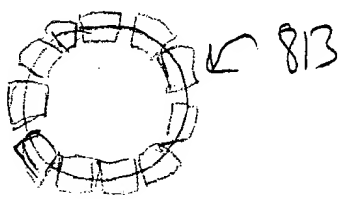


FIGURE 41

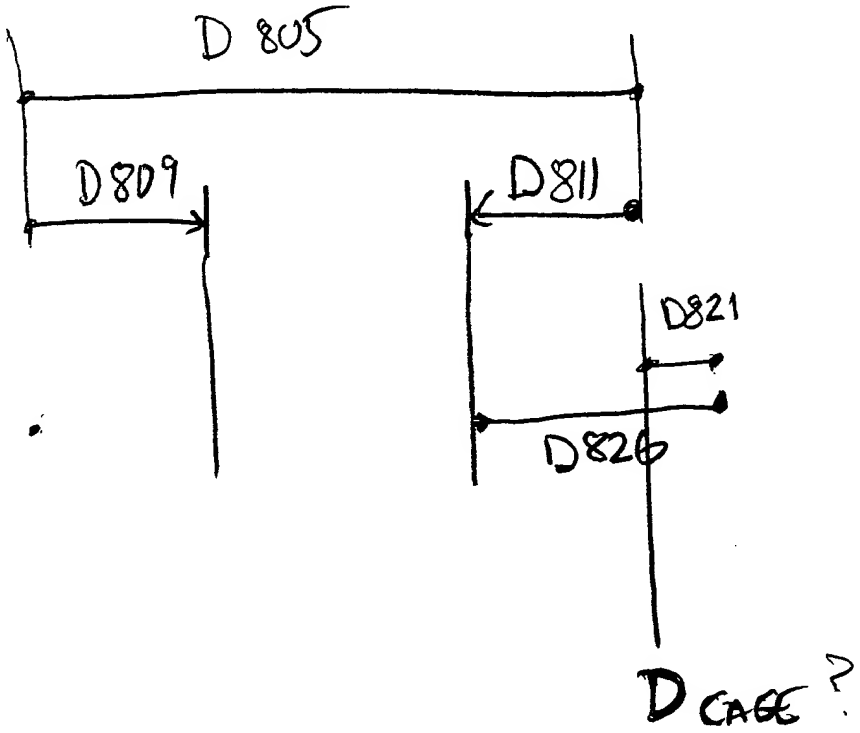


FIG 42

$$D_{CAGE} = (D805 - D809 - D811) + (D826 - D821)$$

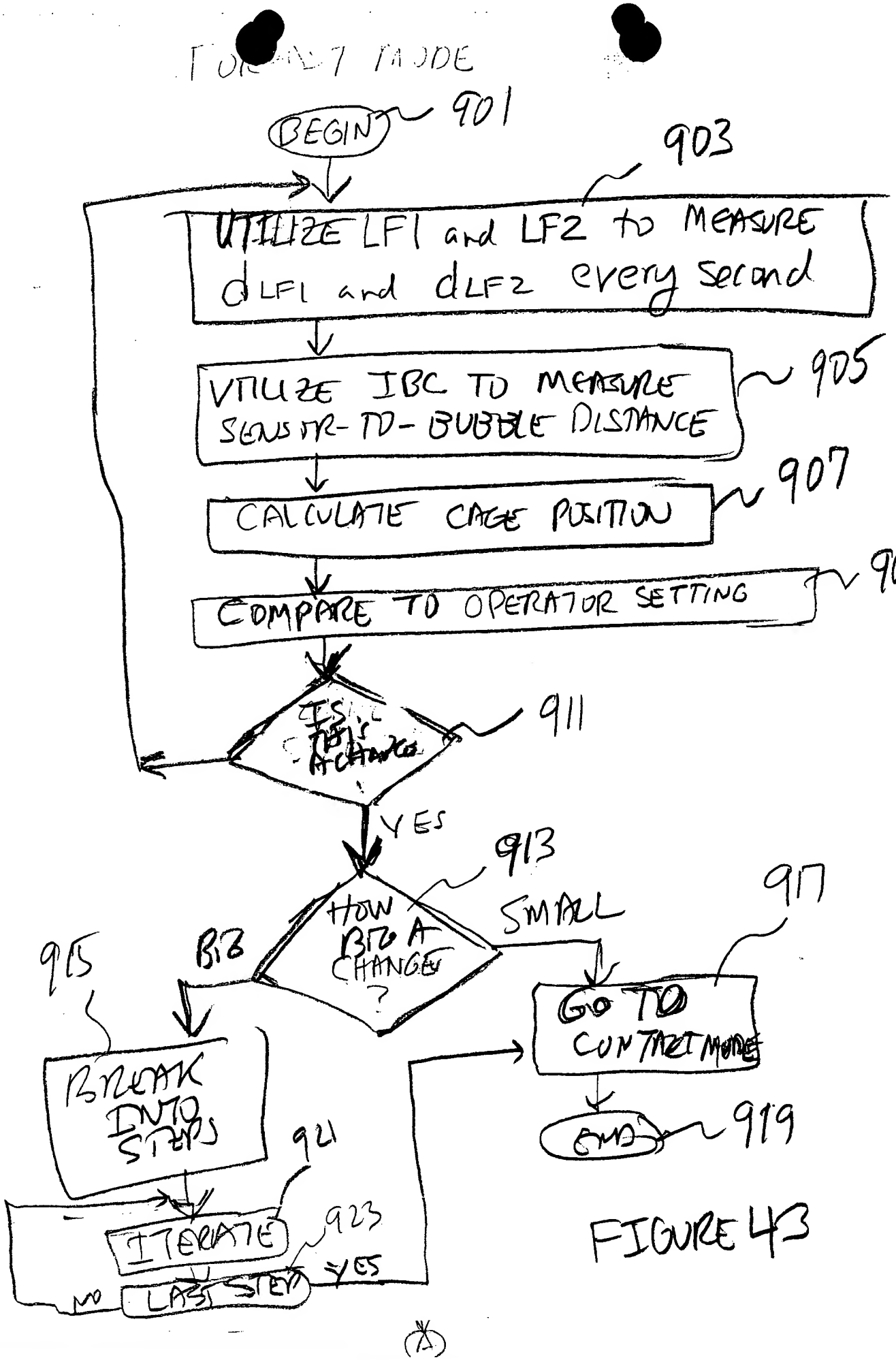

FORCE MODE
BEGIN
901
903
UTILIZE LF1 and LF2 to MEASURE dLF1 and dLF2 every second
VTILIZE IBC TO MEASURE SENSOR-TO-BUBBLE DISTANCE
905
CALCULATE CAGE POSITION
907
COMPARE TO OPERATOR SETTING
909
IS IBC's CHANGED
911
YES
913
HOW BIG A CHANGE?
BIG
SMALL
915
917
BREAK INTO STEPS
GO TO CONTACT MODE
921
ITERATE
923
LAST STEP
NO
YES
END
919

FIGURE 43

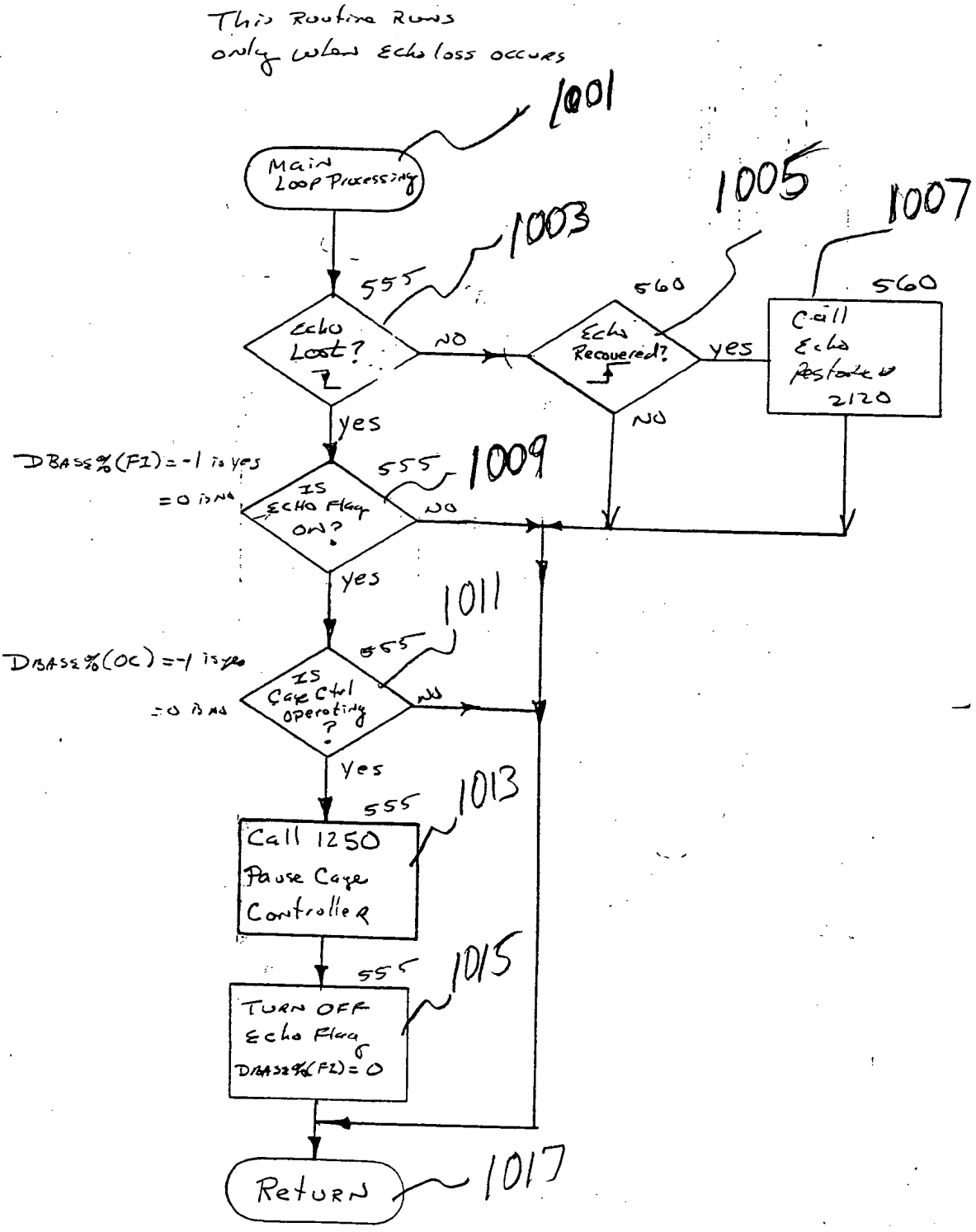

This Routine Runs only when Echo loss occurs
1001
Main Loop Processing
555
1003
Echo Lost?
NO
560
1005
Echo Recovered?
yes
560
1007
Call Echo Restore 2120
NO
yes
DBASE%(FI) = -1 is yes
= 0 is no
555
1009
IS Echo Flag ON?
NO
yes
DBASE%(OC) = -1 is yes
= 0 is no
555
1011
IS Cage Ctrl Operating ?
NO
yes
555
1013
Call 1250 Pause Cage Controller
555
1015
TURN OFF Echo Flag DBASE%(FI) = 0
Return
1017

FIGURE 44A

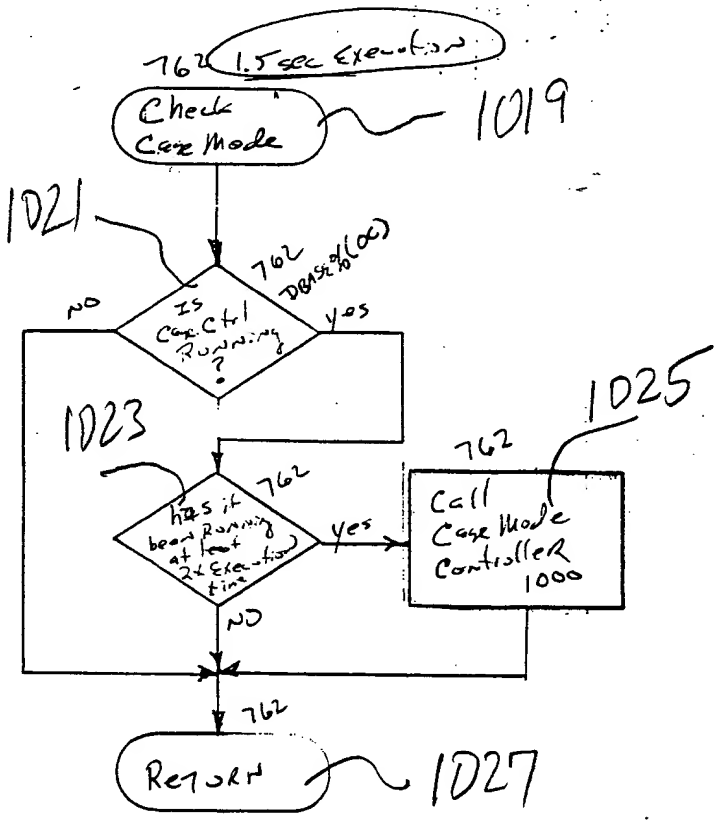

762
1.5 sec Execution
Check Case Mode
1019
1021
762
Is Cse Ctrl Running ?
NO
YES
1023
762
has it been Running at last 2 Execution time
YES
NO
1025
762
Call Case Mode Controller 1000
762
Return
1027

FIGURE 44B

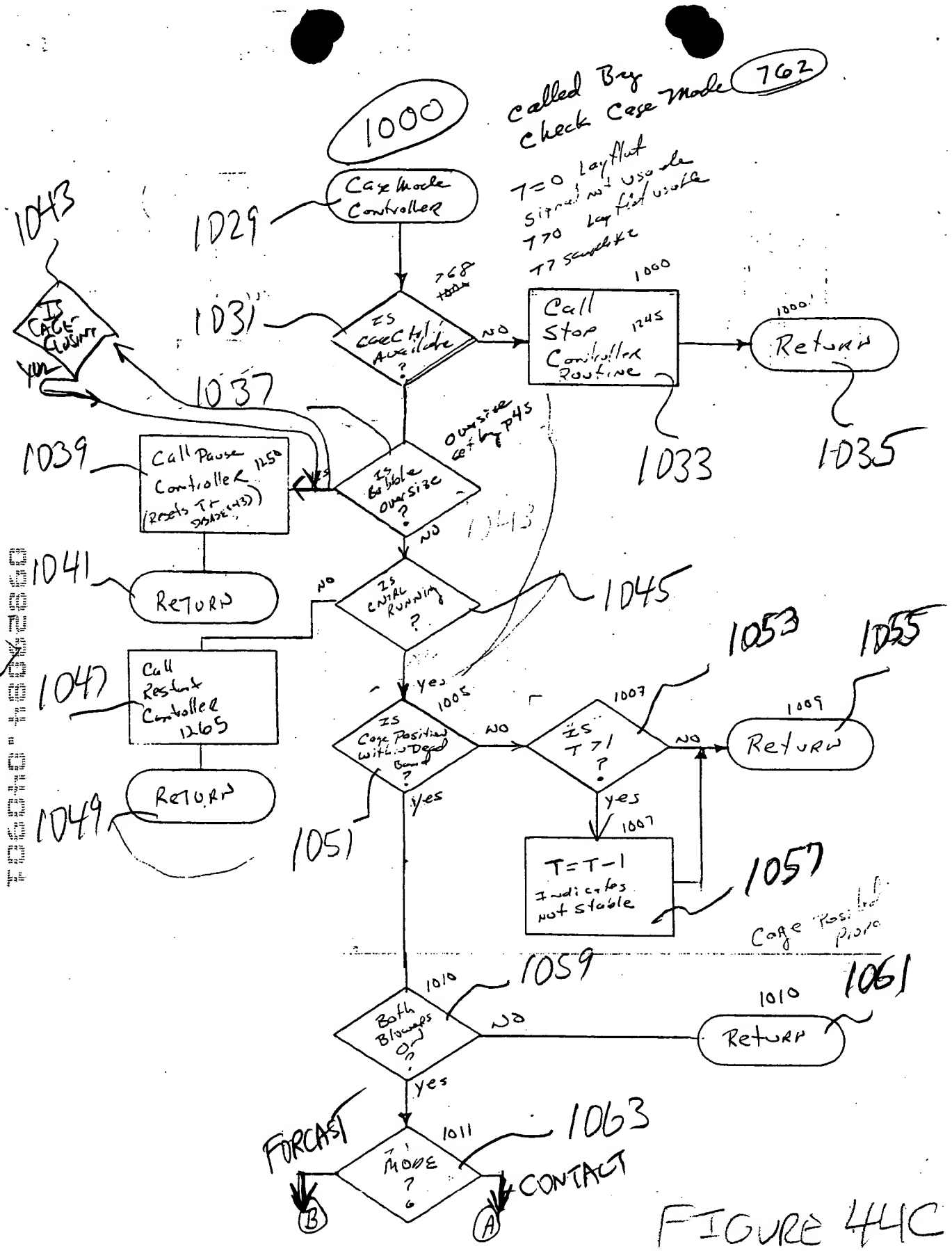

1000
Called By Check Case Mode 762
Cage Mode Controller
1029
T=0 Layflat signal not usable
T70 Layflat usable
T7 Sensitive
768 Table
1031
Is Correct Available ?
NO
1000
Call Stop Controller Routine 1245
1033
1000'
Return
1035
1043
Is Cage Closed ?
YES
1037
1039
Call Pause Controller 1250 (Resets T+ Disable 1043)
YES
Is Bubble Oversize ?
Oversize set by P45
1043
NO
1041
RETURN
NO
Is CNTRL Running ?
1045
1047
Call Restart Controller 1265
1049
RETURN
yes
1005
Is Cage Position within Deadband ?
NO
1007
Is T>1 ?
NO
1053
1009
Return
1055
yes
1051
1007
T=T-1
Indicates not stable
1057
Cage Position Prior
1059
1010
Both Blowers On ?
NO
1010
Return
1061
yes
FORCAST
1011
Mode ?
1063
CONTACT
B
A

FIGURE 44C

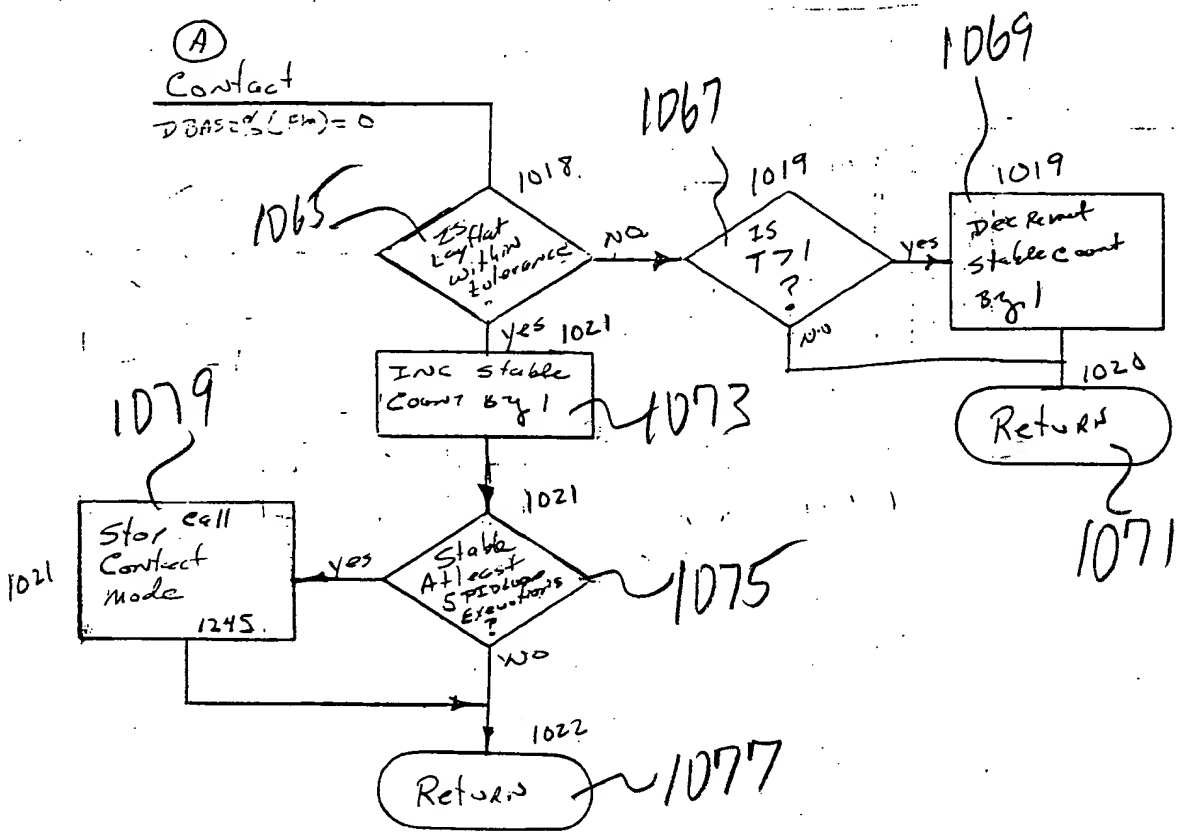


FIGURE 44D

CONTACT MODE

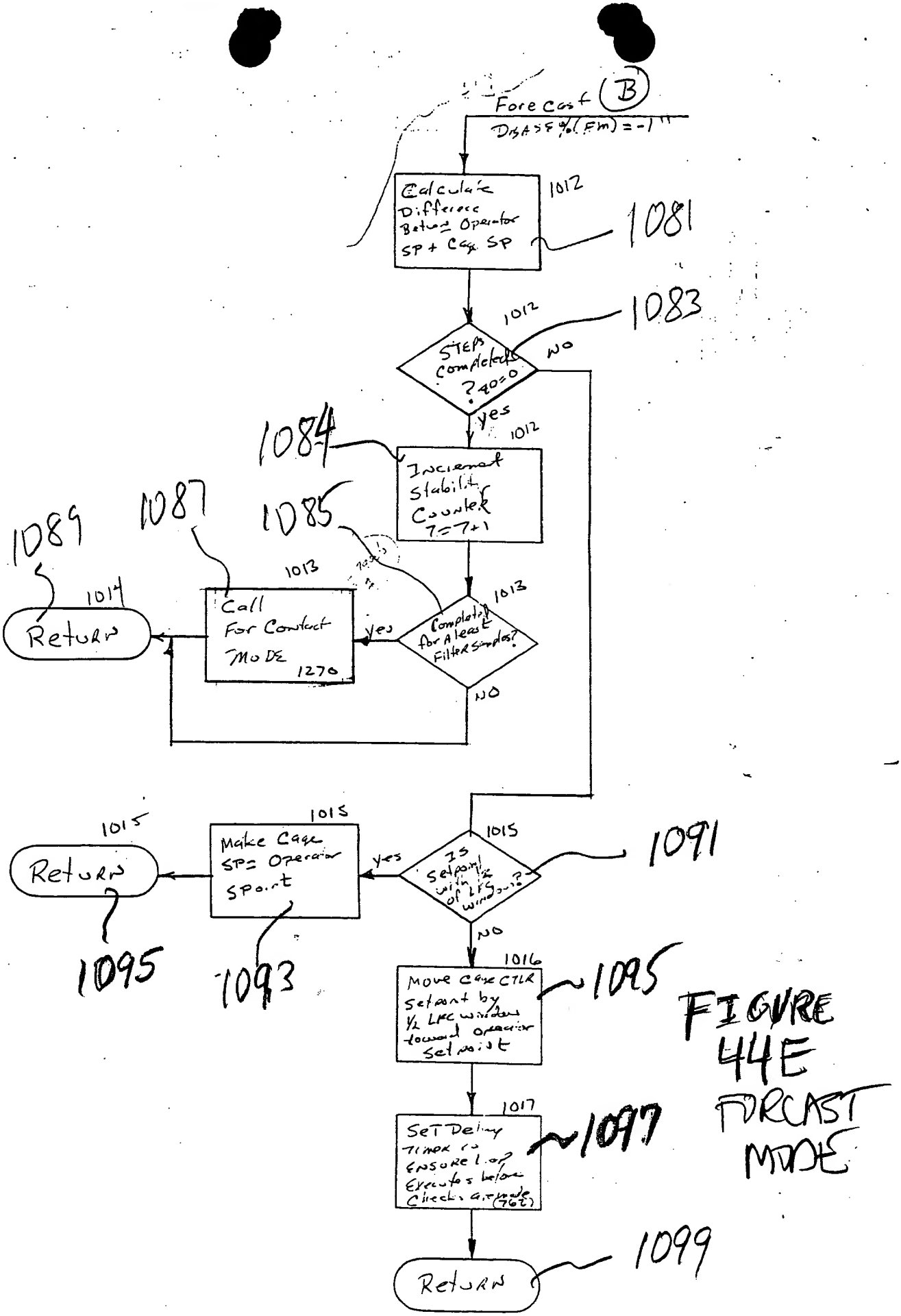


FIGURE 44E
FORCAST MODE

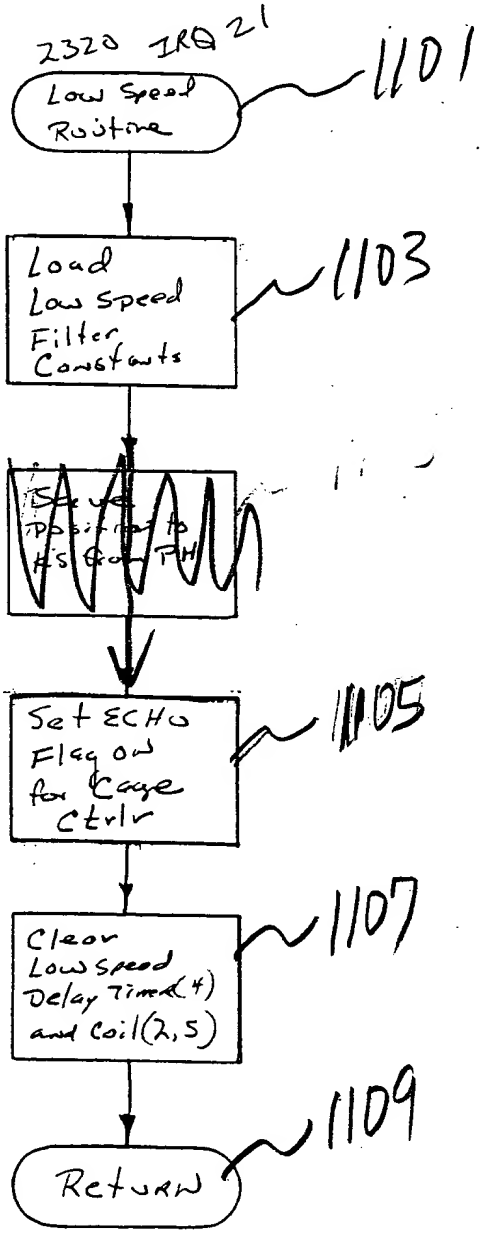

2320 IRQ 21
Low Speed Routine
1101
Load Low Speed Filter Constants
1103
Set ECHO Flag on for Cage Ctrlr
1105
Clear Low Speed Delay Timer(4) and Coil(2,5)
1107
Return
1109

FIGURE 44F

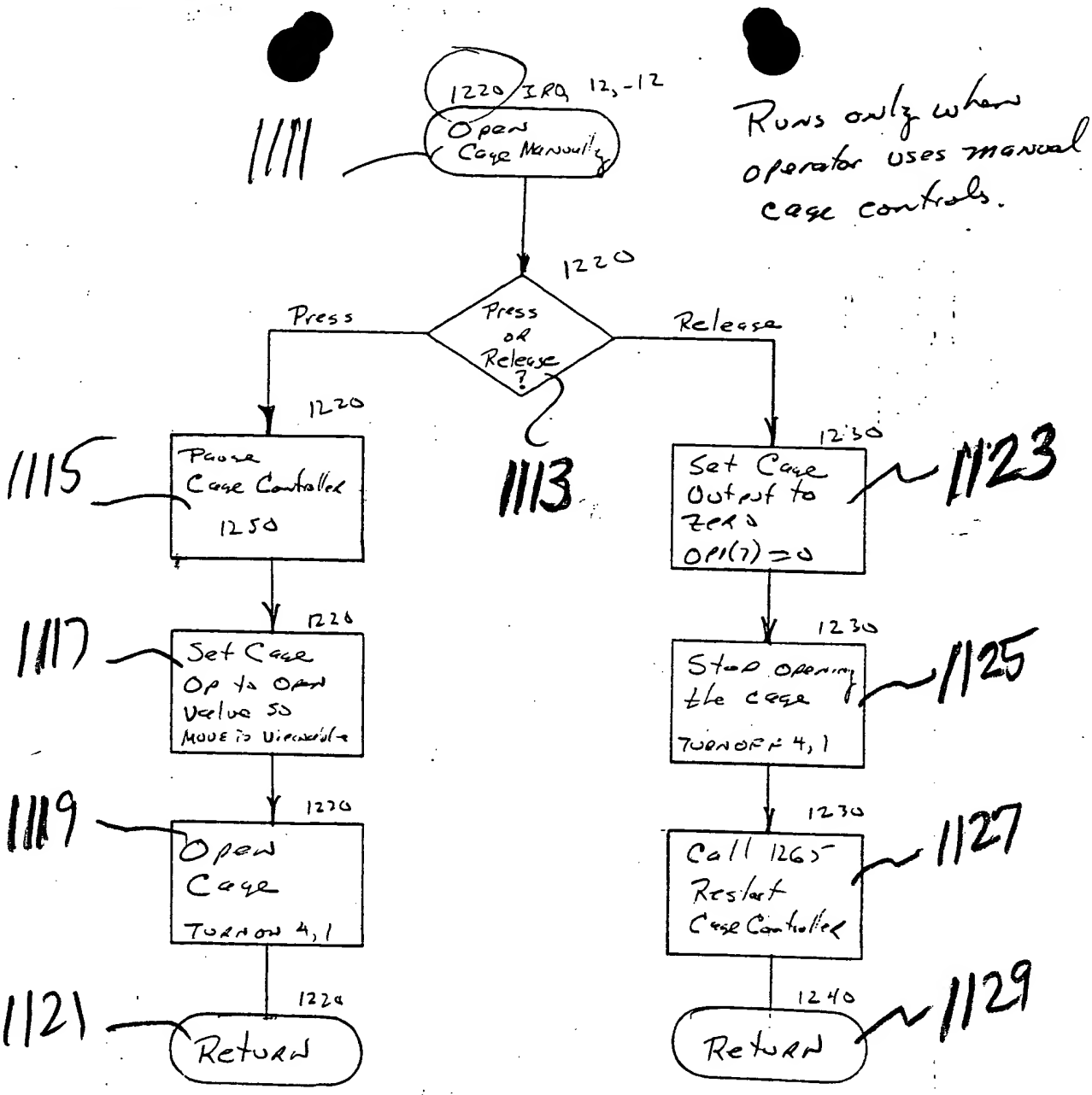

1220 IRQ 12,-12
Open Cage Manually
1111
Runs only when operator uses manual cage controls.
1220
Press or Release ?
Press
Release
1113
1220
Pause Cage Controller 1250
1115
1220
Set Cage Op to Open Value 50 Mode to Direct
1117
1220
Open Cage Turn On 4,1
1119
1220
Return
1121
1230
Set Cage Output to Zero OP1(7) = 0
1123
1230
Stop opening the cage Turn Off 4,1
1125
1230
Call 1265 Restart Cage Controller
1127
1240
Return
1129

FIGURE 44G

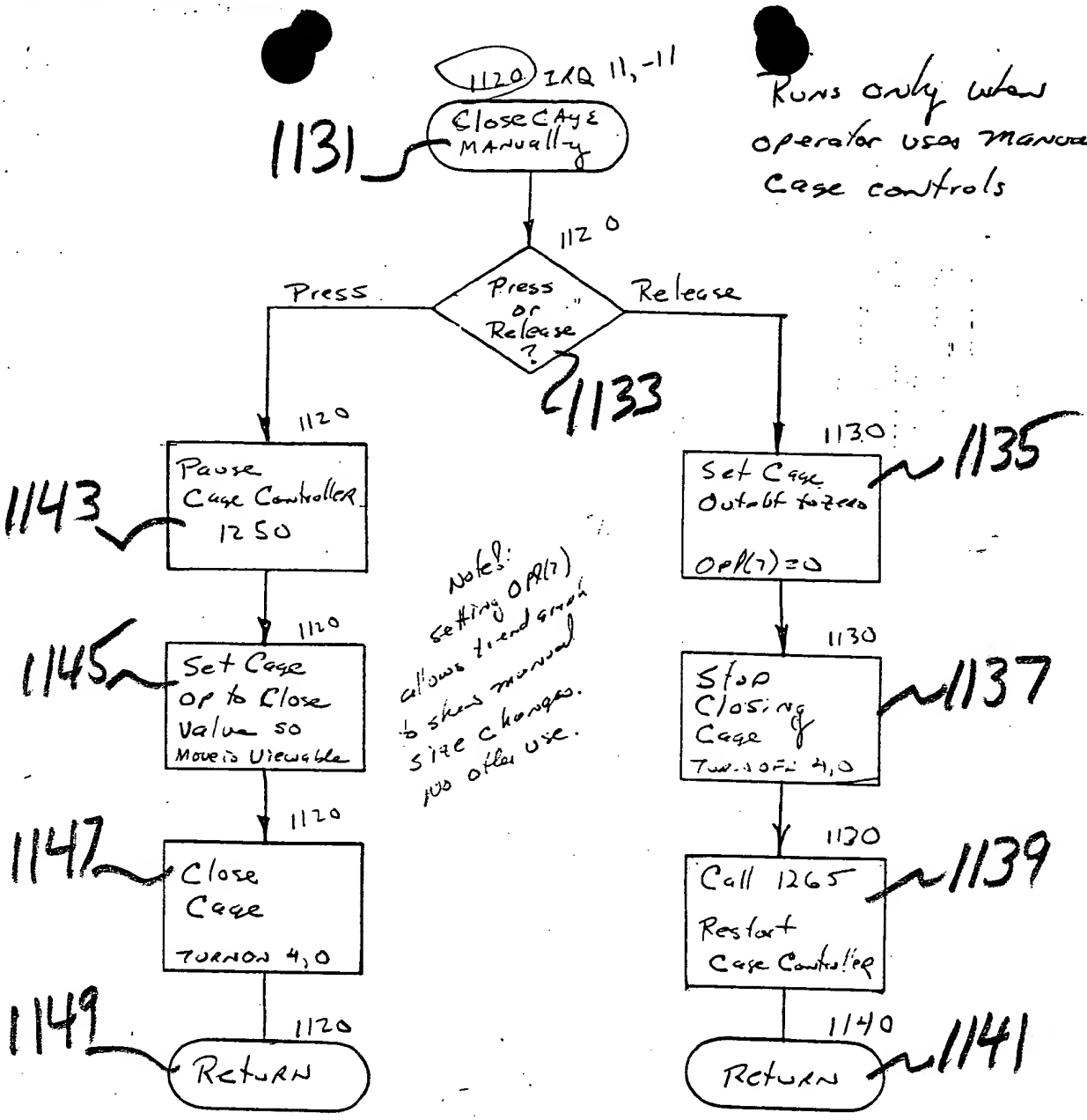

1120 IRQ 11, -11
Runs only when operator uses manual Case controls
1131
Close CAVE MANUALLY
1120
Press or Release ?
1133
Press
Release
1120
1143
Pause Case Controller 1250
1120
1145
Set Case OP to Close Value so Moves is Viewable
1120
1147
Close Case
TURN ON 4,0
1120
1149
RETURN
Note: setting OP(7) allows trend graph to show manual size changes. No other use.
1130
1135
Set Case Output to zero
OP(7) = 0
1130
1137
Stop Closing Case
TURN OFF 4,0
1130
1139
Call 1265 Restart Case Controller
1140
1141
RETURN

FIGURE 44H

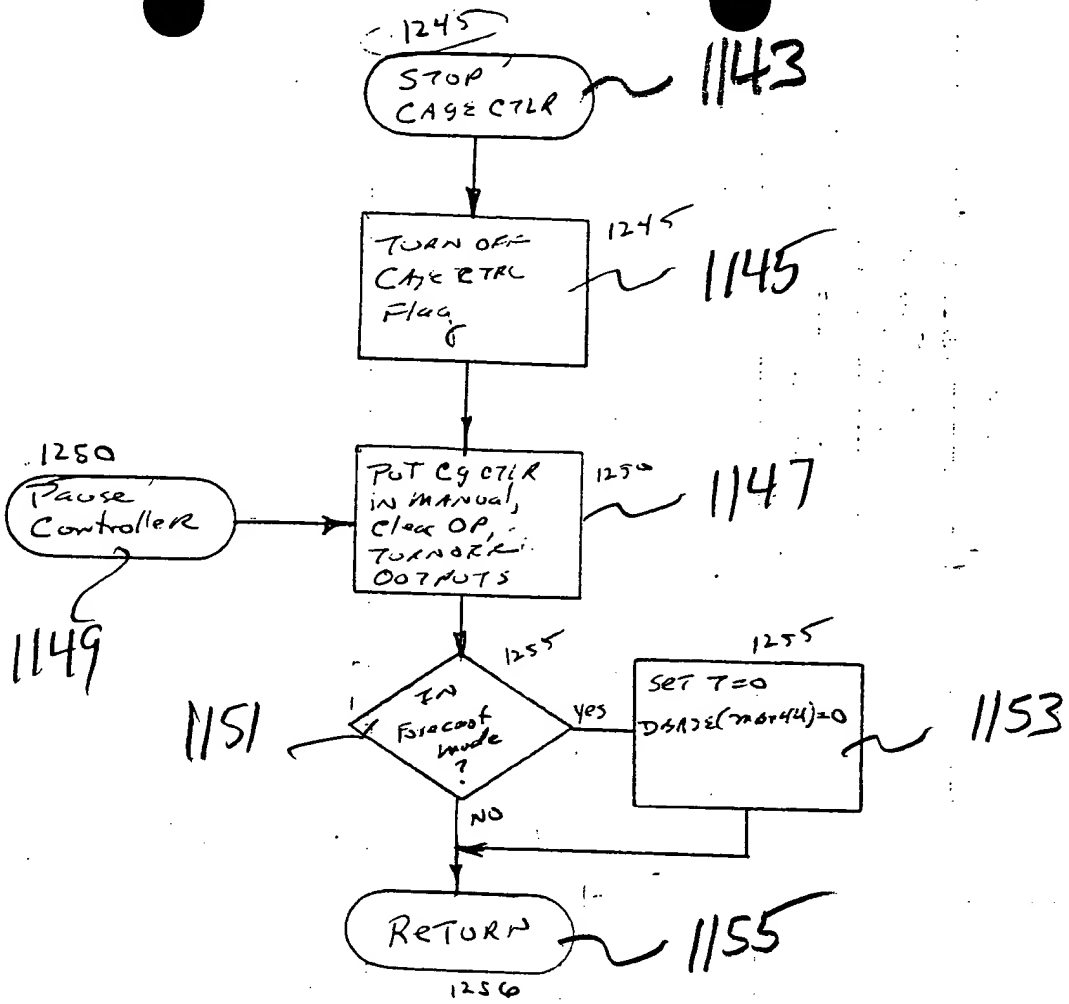

1245
STOP CAGE CTLR
1143
TURN OFF CAGE CTRL Flag
1245
1145
1250
Pause Controller
PUT Cg CTLR IN MANUAL, Clear OP, TURN OFF OUTPUTS
1250
1147
1149
1255
1255
1151
IN Forecast mode ?
yes
SET T=0 DSIZE(mat44)=0
1153
NO
RETURN
1155
1256

FIGURE 44I

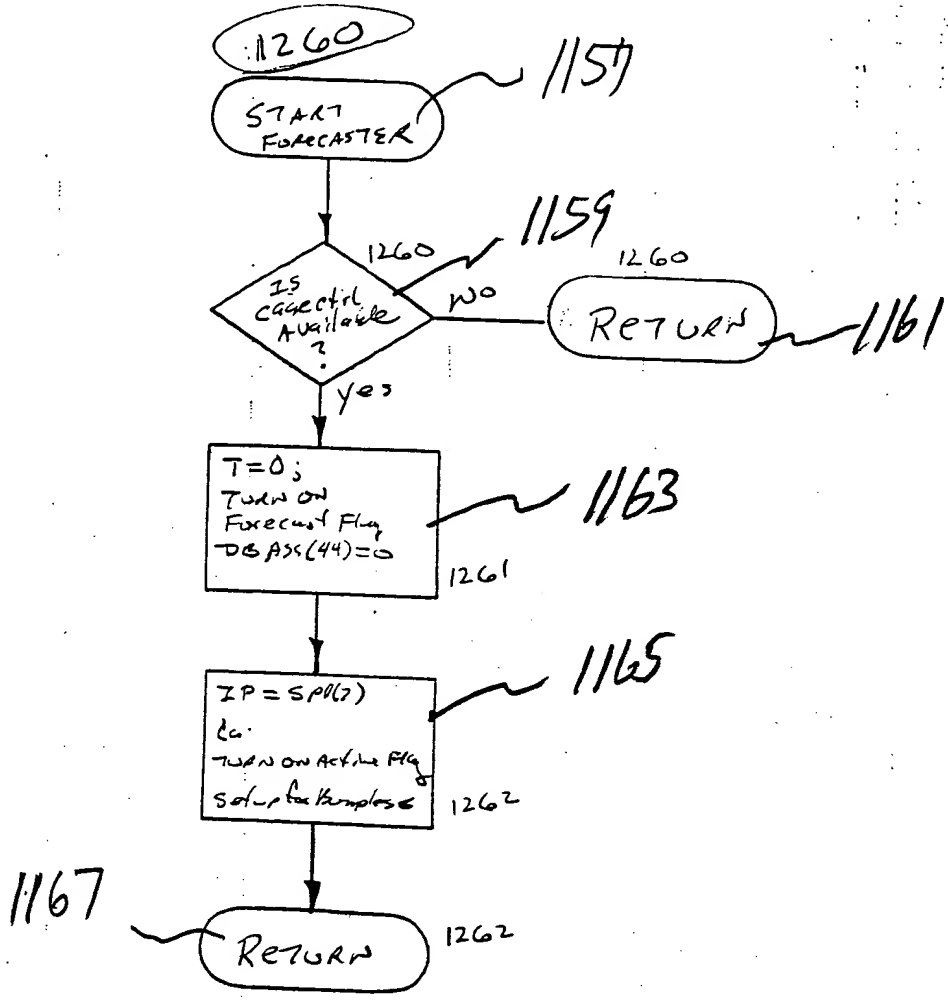

1260
START FORECASTER
1157
1159
1260
IS CGGEOFRL AVAILABLE ?
NO
1260
RETURN
1161
YES
T=0;
TURN ON FORECAST FLAG
DBASS(44)=0
1261
1163
IP=SPL(7)
CALL
TURN ON ACTIVE FLAG
SET UP FOR TEMPLATE
1262
1165
1167
RETURN
1262

FIGURE 44J

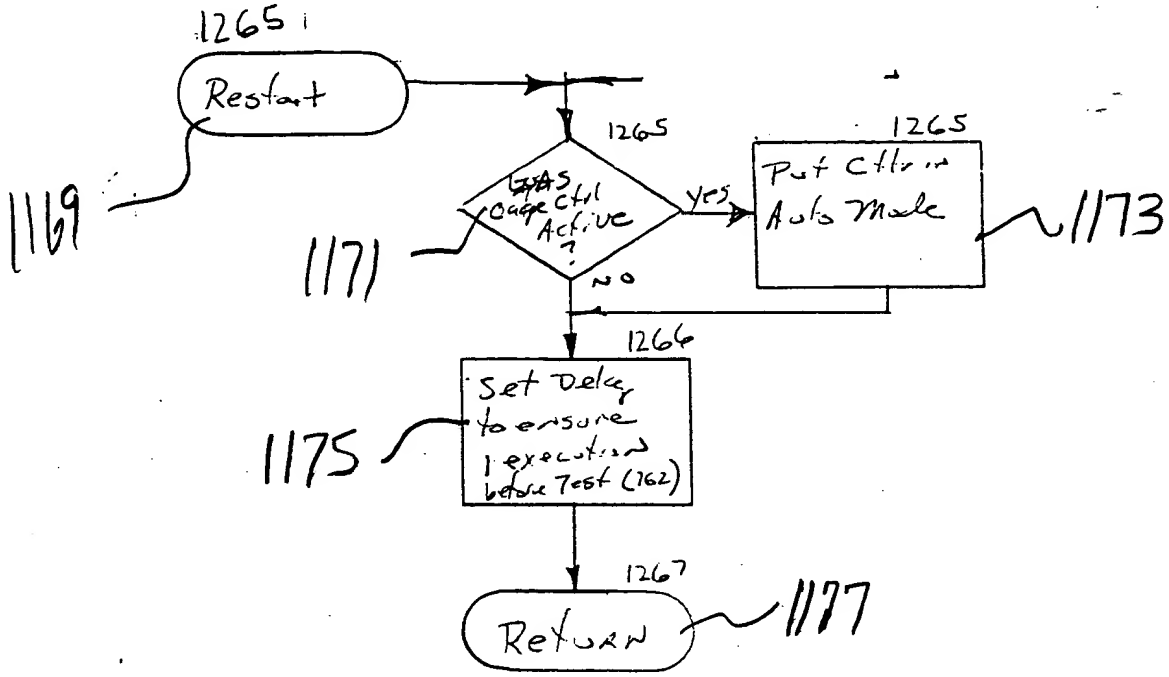

1265
Restart
1169
1265
Cage Ctrl Active ?
1171
yes
1265
Put Ctlr in Auto Mode
1173
NO
1266
Set Delay to ensure 1 execution before Test (762)
1175
1267
Return
1177

FIGURE 44K

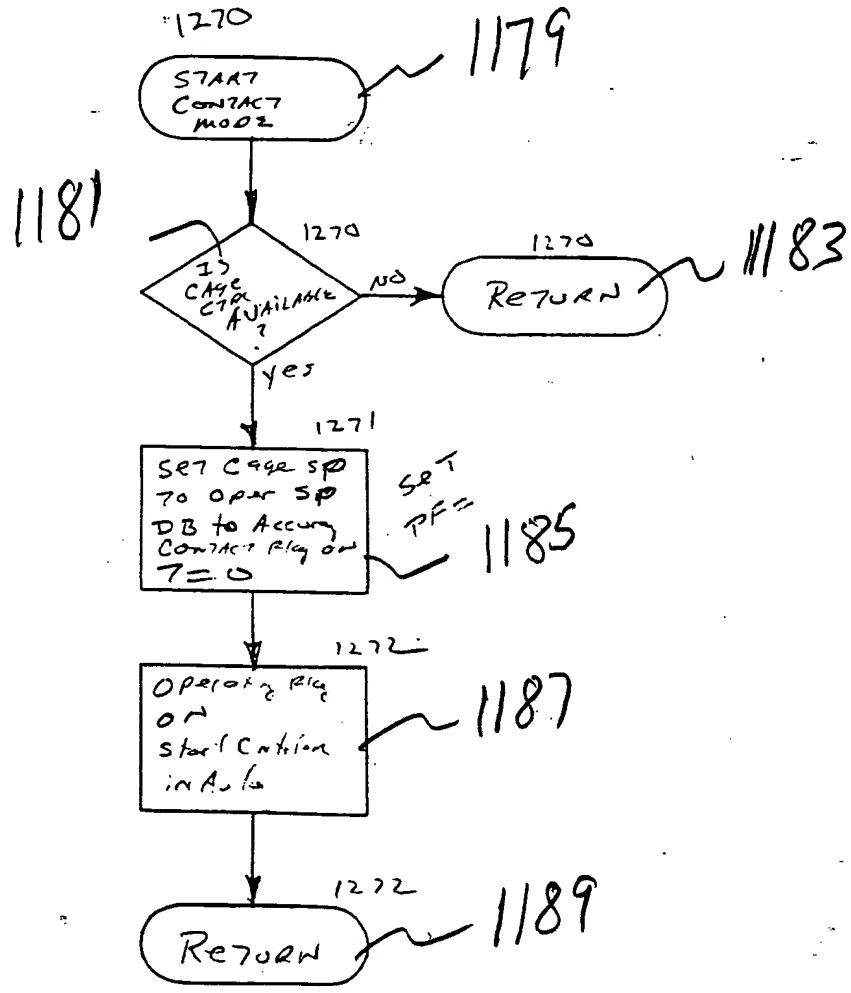

1270
START CONTACT MODE
1179
1181
1270
IS CAGE CTR AVAILABLE ?
NO
1270
RETURN
1183
YES
1271
SET CAGR SP TO OPER SP DB to Accum CONTACT Flg on T=0
SET PF=
1185
1272
Operating Flg ON Start Cation in Auto
1187
1272
RETURN
1189

FIGURE 44L

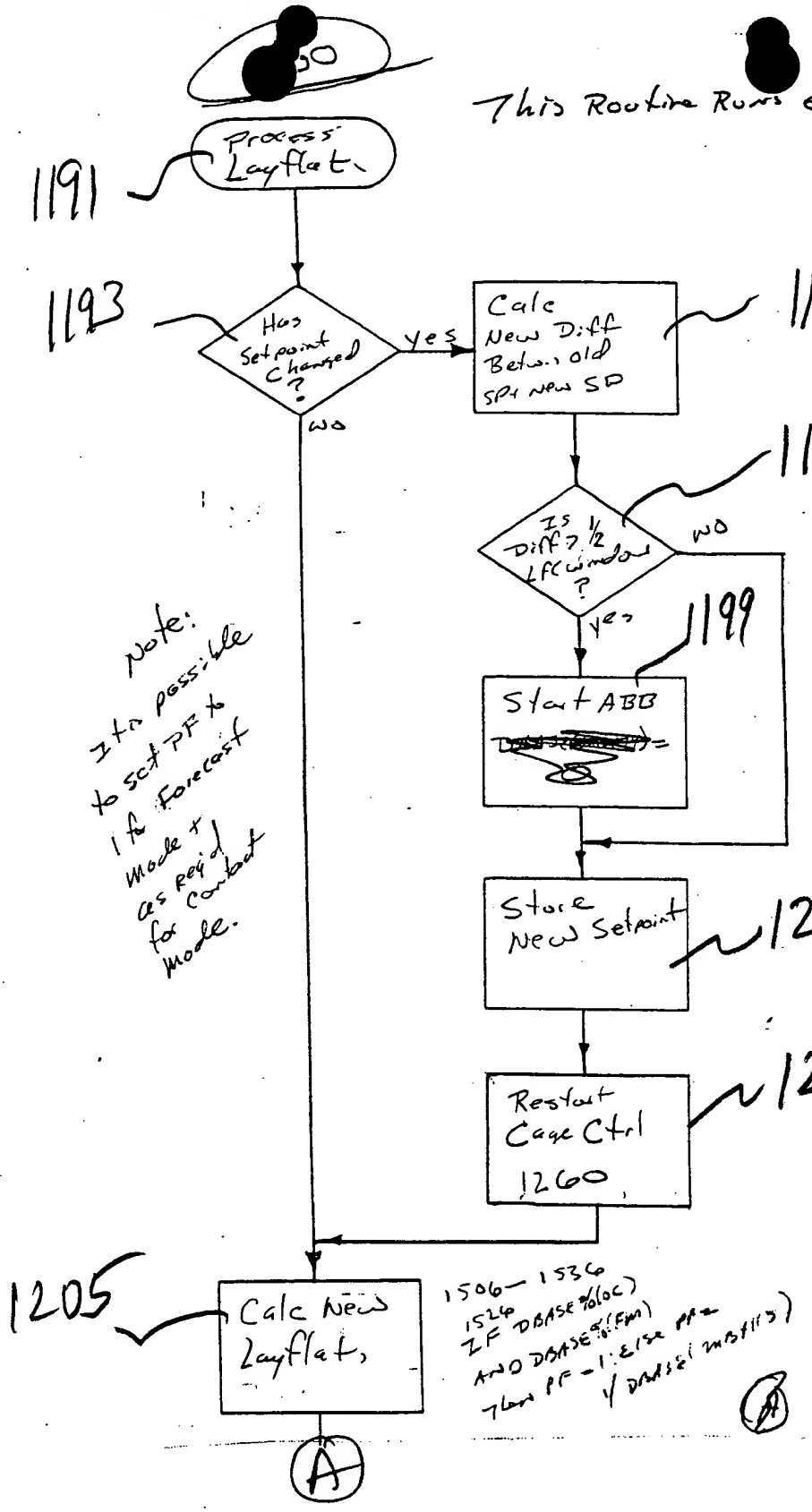

50
This Routine Runs every second
Process Layflat
1191
1193
Has Setpoint Changed ?
yes
no
Calc New Diff Betw. old SP & new SP
1195
1197
Is Diff > 1/2 LFC window ?
no
yes
1199
Start ABB
Store New Setpoint
1201
Restart Cage Ctrl 1260
1203
1205
Calc New Layflat
1506 – 1536
1526 IF DBASE%(OC)
AND DBASE%(FM)
THEN PF = 1 : ELSE PF =
1/ DBASE(INSTR)
A
A
Note:
Its possible to set PF to forecast for mode & mode 1 as req'd for combat mode.

FIGURE 44M

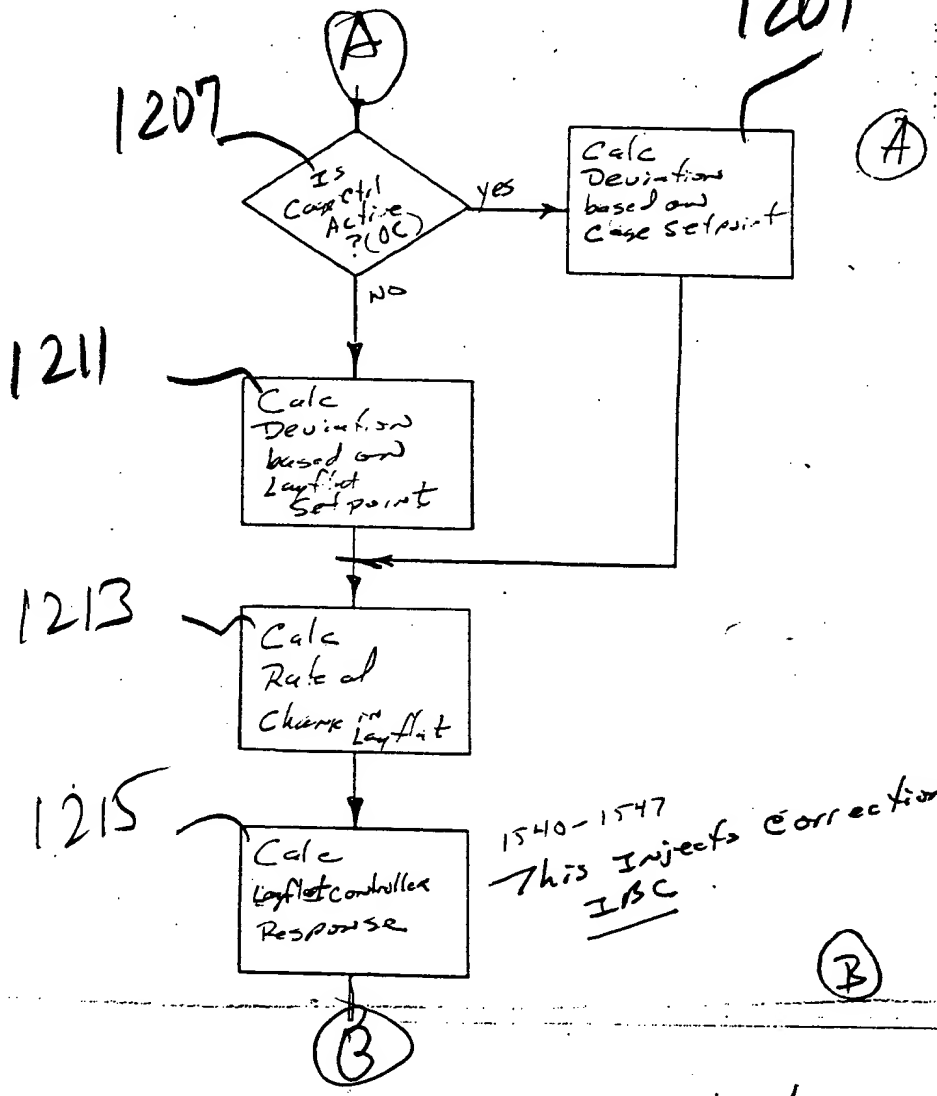

A
1207
Is Capctrl Active ?(OC)
yes
1209
Calc Deviation based on Case setpoint
A
NO
1211
Calc Deviation based on Layflat Setpoint
1213
Calc Rate of Change in Layflat
1215
Calc Layflat controller Response
1540-1547
This Injects correction signal to IBC
B
B

FIGURE 44N

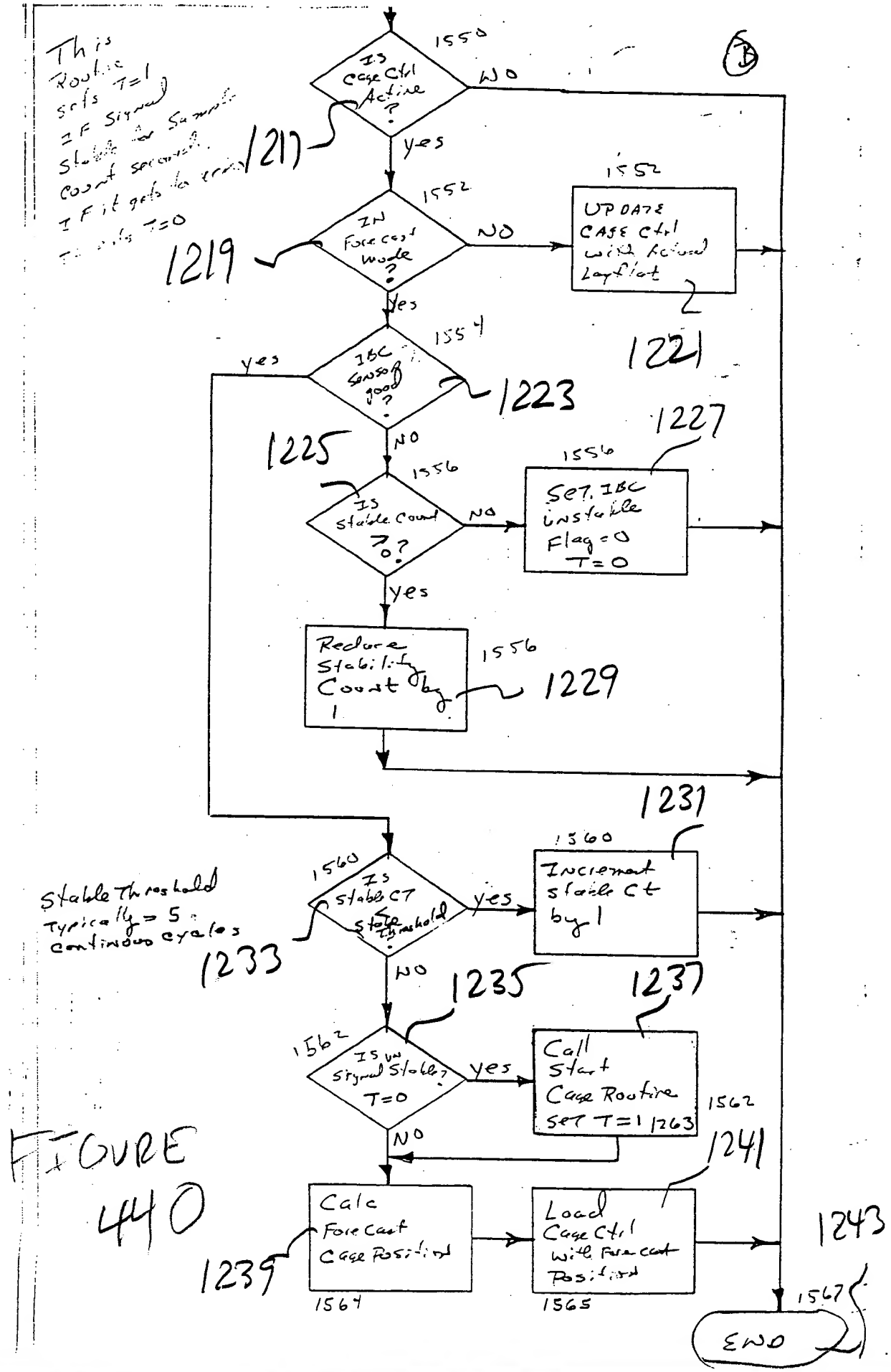

This Routine sets T=1 IF Signal Stable for Sample Count seconds. IF it gets to zero it sets T=0
1550
Is Cage Ctrl Active ?
NO
yes
1217
1552
In Forecast Mode ?
NO
1552
UPDATE CAGE Ctrl with Actual Lay flat
1221
yes
1554
IBC Sensor good ?
yes
1223
1225
NO
1227
1556
Is Stable Count > 0 ?
NO
1556
Set IBC unstable Flag = 0 T = 0
yes
Reduce Stability Count by 1
1556
1229
1231
1560
Is Stable CT > Stable Threshold ?
yes
1560
Increment stable Ct by 1
Stable Threshold Typically = 5 continuous cycles
1233
NO
1235
1237
1562
Is SW Signal Stable ? T=0
yes
Call Start Cage Routine Set T=1 1263
1562
NO
1241
Calc Forecast Cage Position
1239
1564
Load Cage Ctrl with Forecast Position
1565
1243
1567
END

FIGURE 440

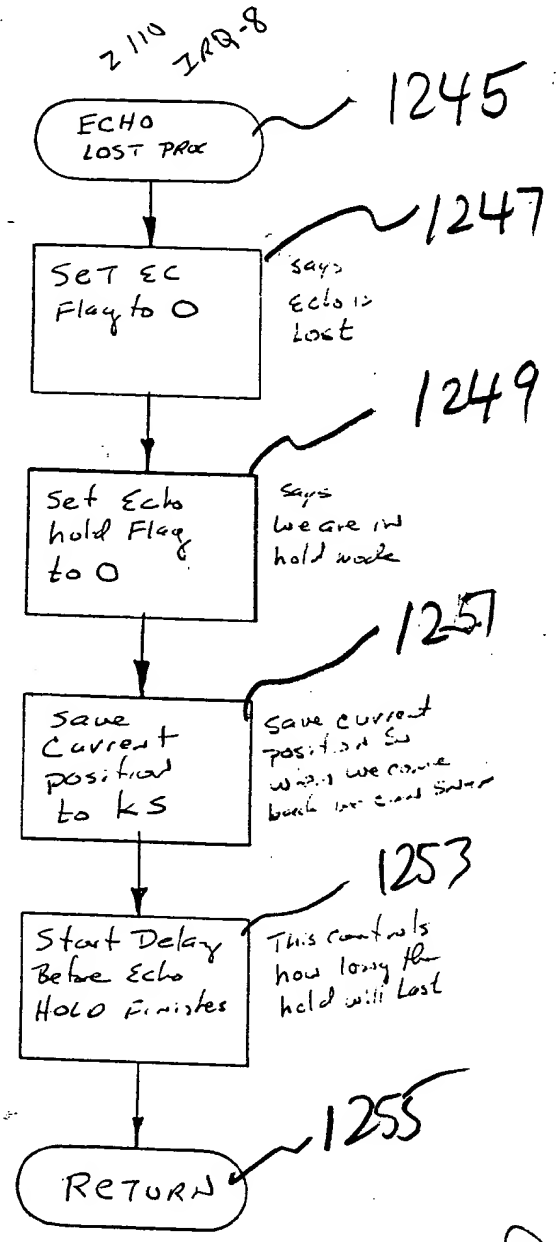

Z 110
IRQ-8
ECHO LOST PROC
1245
SET EC Flag to 0
says Echo is Lost
1247
Set Echo hold Flag to 0
says we are in hold mode
1249
Save Current position to KS
Save current position so when we come back we can start
1251
Start Delay Before Echo HOLD Finishes
This controls how long the hold will last
1253
RETURN
1255

FIGURE 44 P

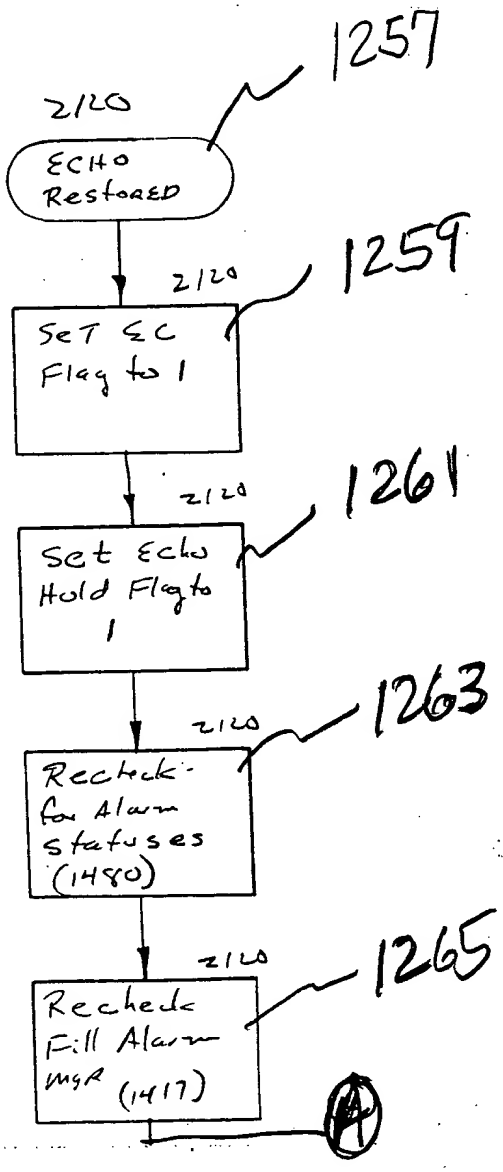

1257
2120
ECHO Restored
1259
2120
Set EC Flag to 1
1261
2120
Set Echo Hold Flag to 1
1263
2120
Recheck for Alarm Statuses (1480)
1265
2120
Recheck Fill Alarm Mgr (1417)
A

FIGURE 44Q

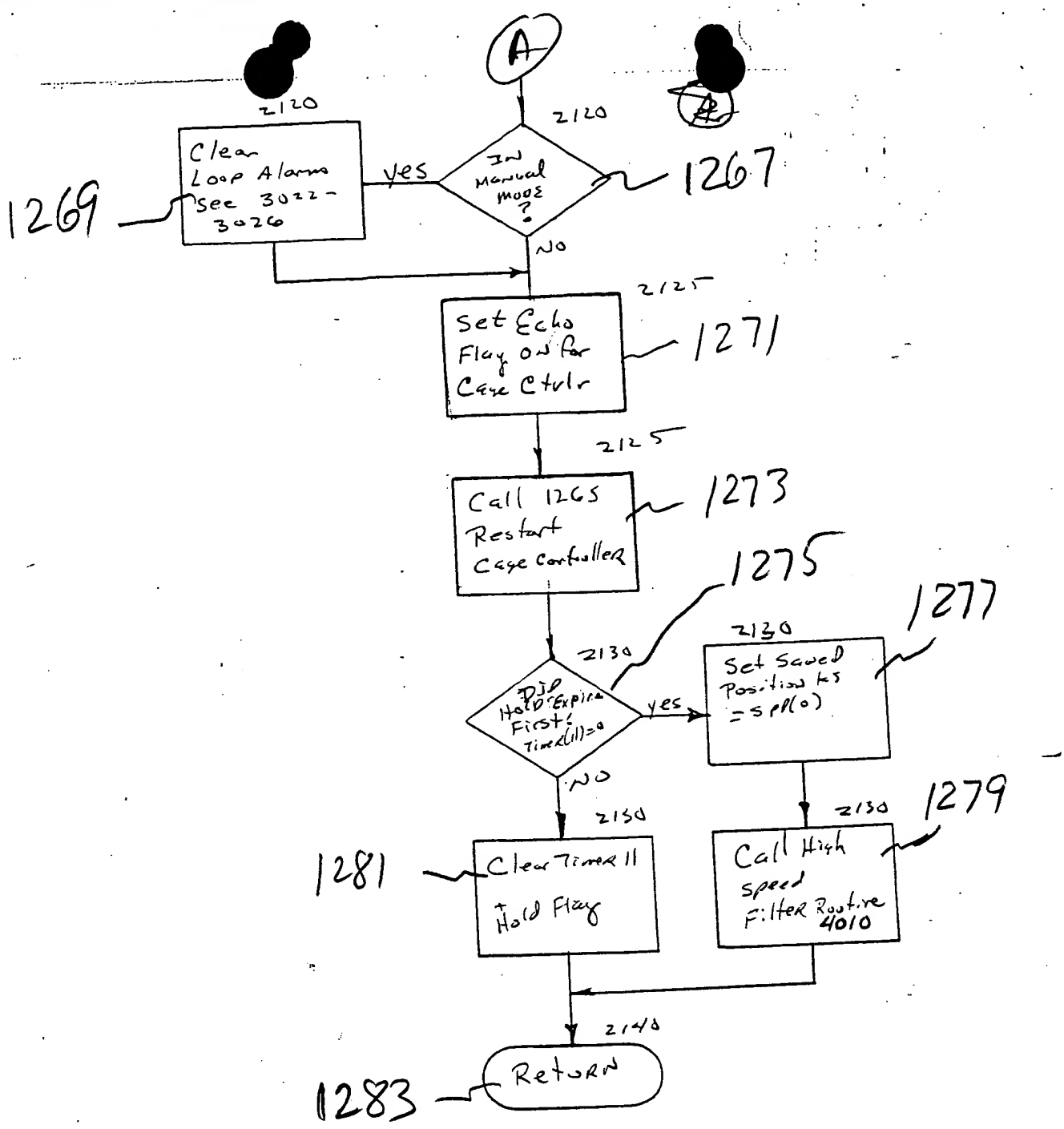

A
2120
2120
Clear Loop Alarm See 3022-3026
yes
In Manual Mode ?
1267
1269
NO
2125
Set Echo Flag ON for Case Ctrlr
1271
2125
Call 1265 Restart Case Controller
1273
1275
2130
DJD Hold Expire First Time(11)=0
yes
2130
Set Saved Position ks = spl(0)
1277
NO
2150
Clear Timer 11 Hold Flag
1281
2130
Call High speed Filter Routine 4010
1279
2140
Return
1283

FIGURE 44R

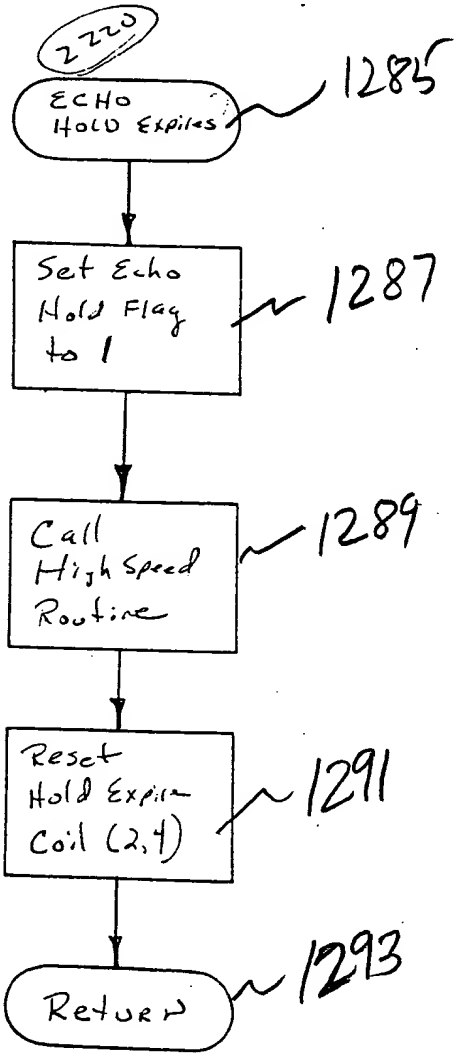

2220
ECHO Hold Expires
1285
Set Echo Hold Flag to 1
1287
Call High Speed Routine
1289
Reset Hold Expir Coil (2,4)
1291
Return
1293

FIGURE 44S

Called By

21[redacted]

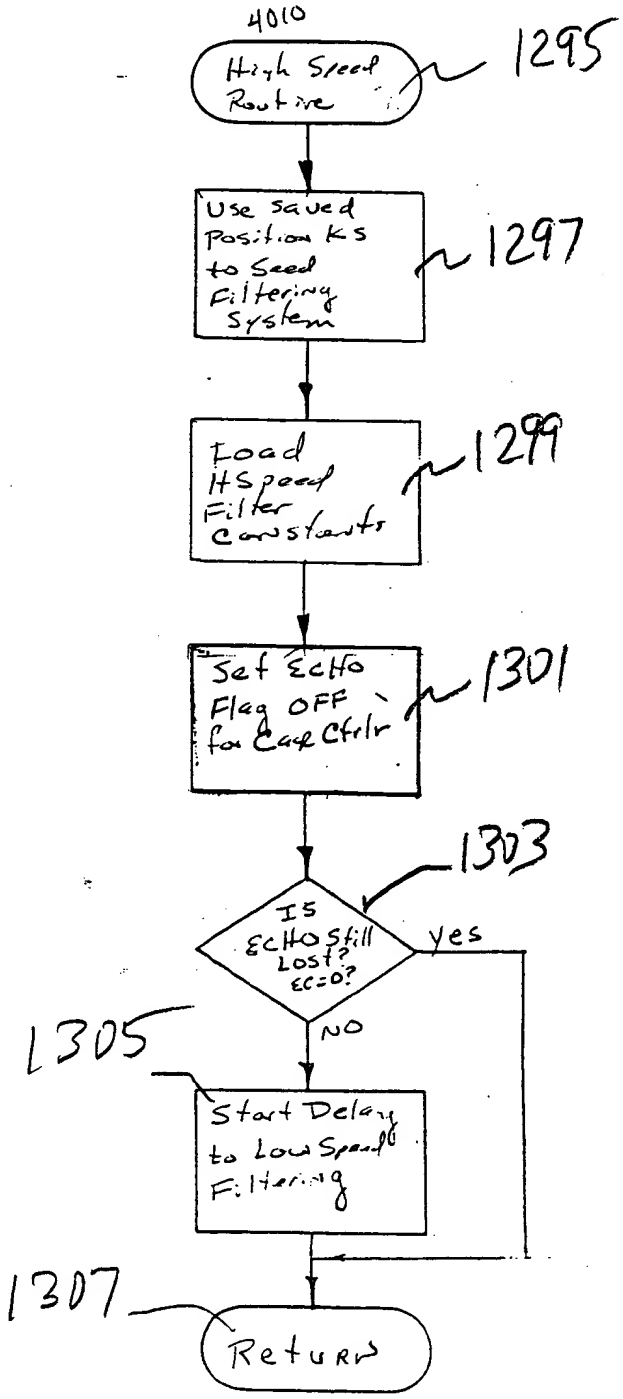


FIGURE 44 T

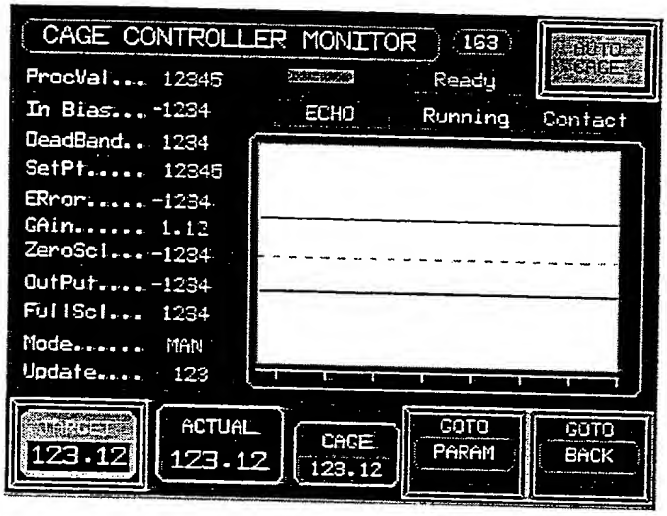

CAGE CONTROLLER MONITOR
163
GOTO CAGE
ProcVal.... 12345
In Bias....-1234
DeadBand.. 1234
SetPt..... 12345
ERror..... -1234
GAin..... 1.12
ZeroScl....-1234
OutPut.....-1234
FullScl... 1234
Mode..... MAN
Update.... 123
Ready
ECHO
Running
Contact
INPROG
123.12
ACTUAL
123.12
CAGE
123.12
GOTO PARAM
GOTO BACK

FIGURE 45

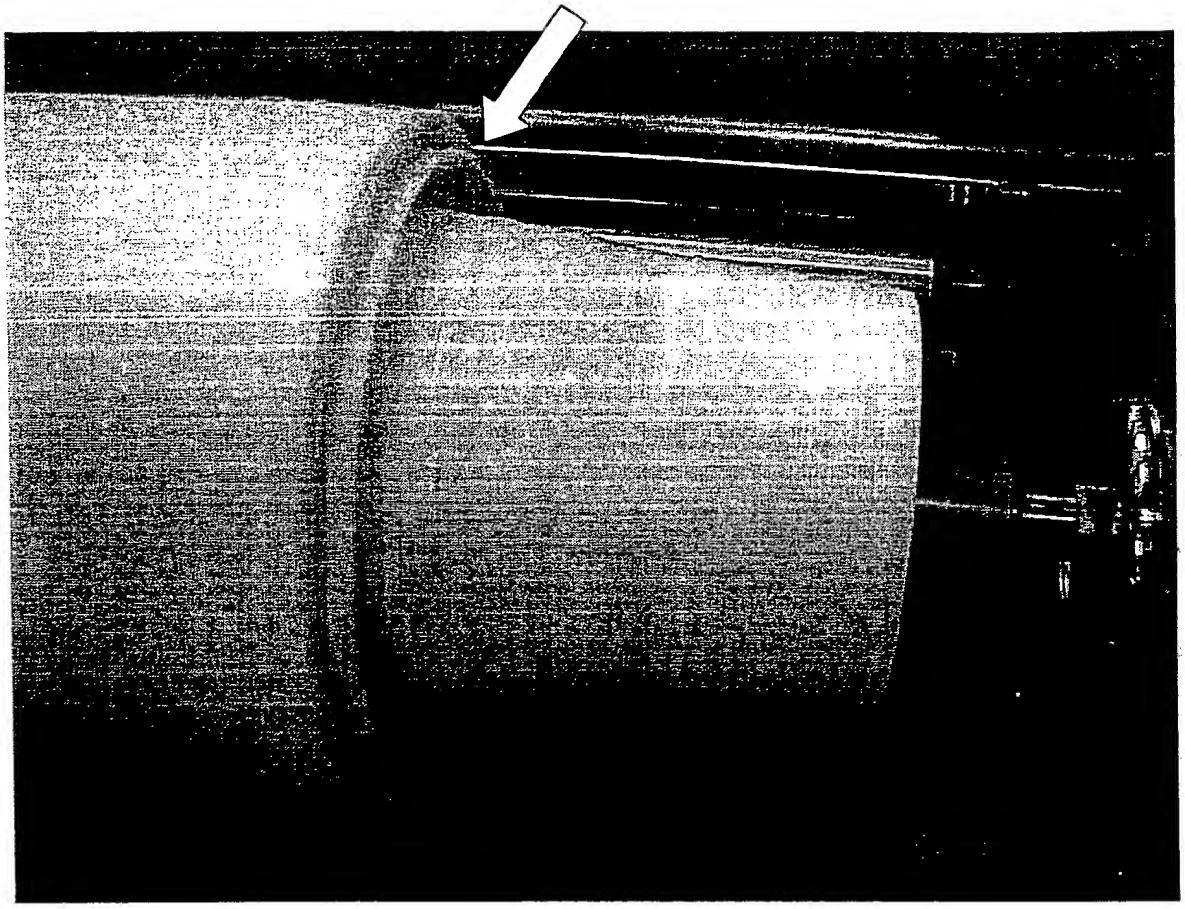


FIGURE 46

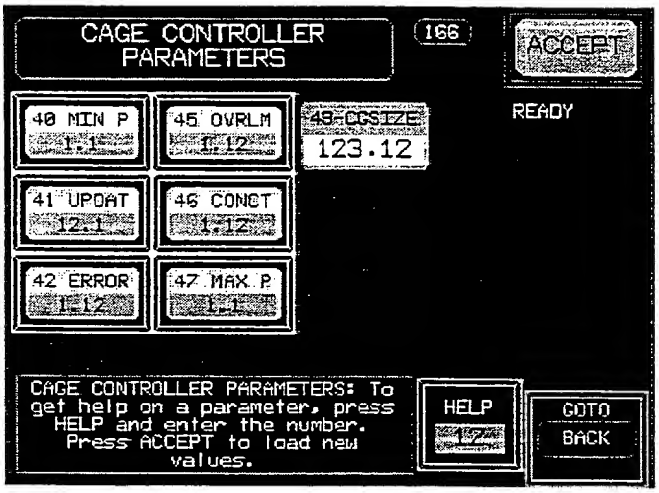

CAGE CONTROLLER PARAMETERS
166
ACCEPT
READY
40 MIN P
1.12
45 OVRLM
1.12
49 CCSIZE
123.12
41 UPDAT
12.1
46 CONCT
1.12
42 ERROR
1.12
47 MAX P
1.1
CAGE CONTROLLER PARAMETERS: To get help on a parameter, press HELP and enter the number. Press ACCEPT to load new values.
HELP
12
GOTO
BACK

FIGURE 47

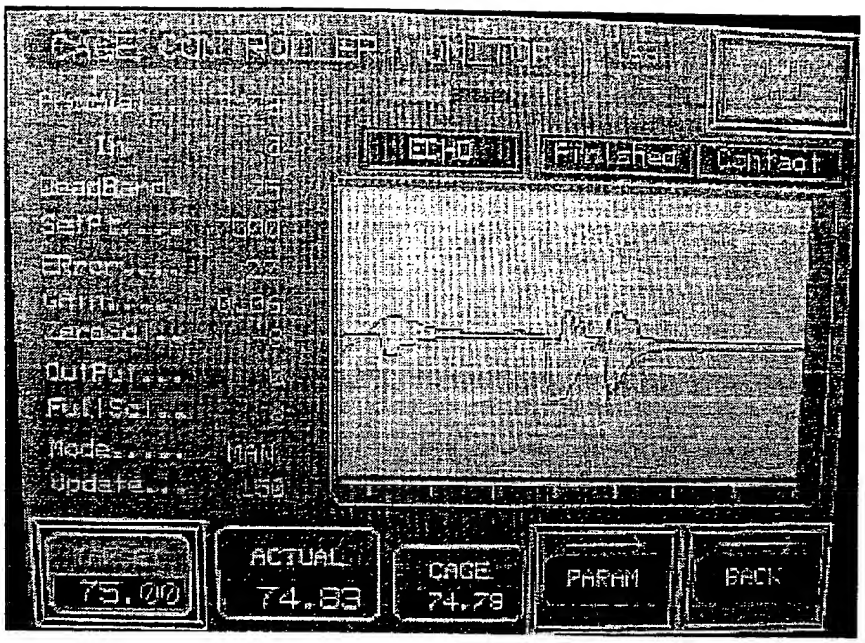


FIGURE 48

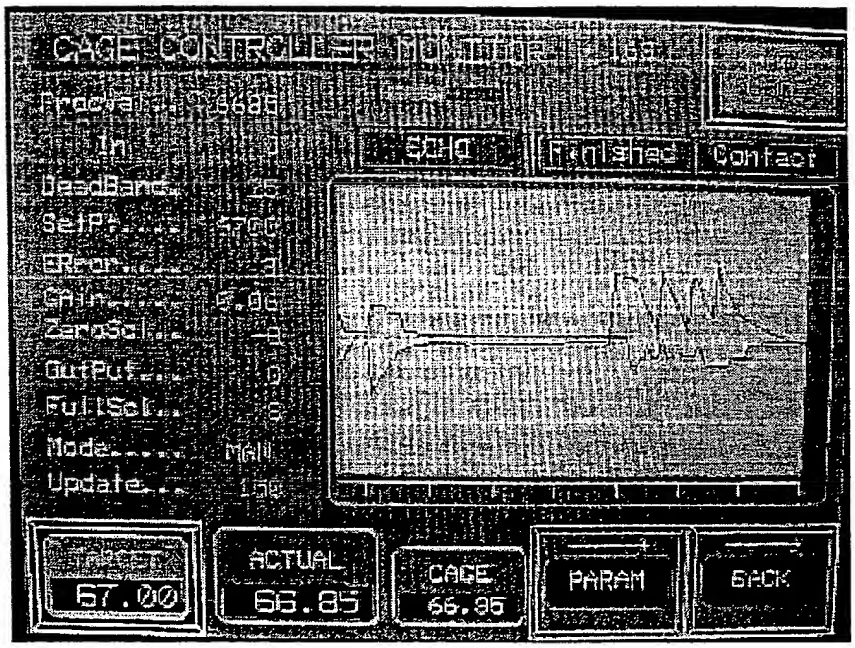

CAGE CONTROLLER
Contact
DeadBand...
SetP...
Gain...
ZeroScl...
OutPut...
FullScl...
Mode.....
Update...
67.00
ACTUAL
66.85
CAGE
66.95
PARAM
BACK

FIGURE 49

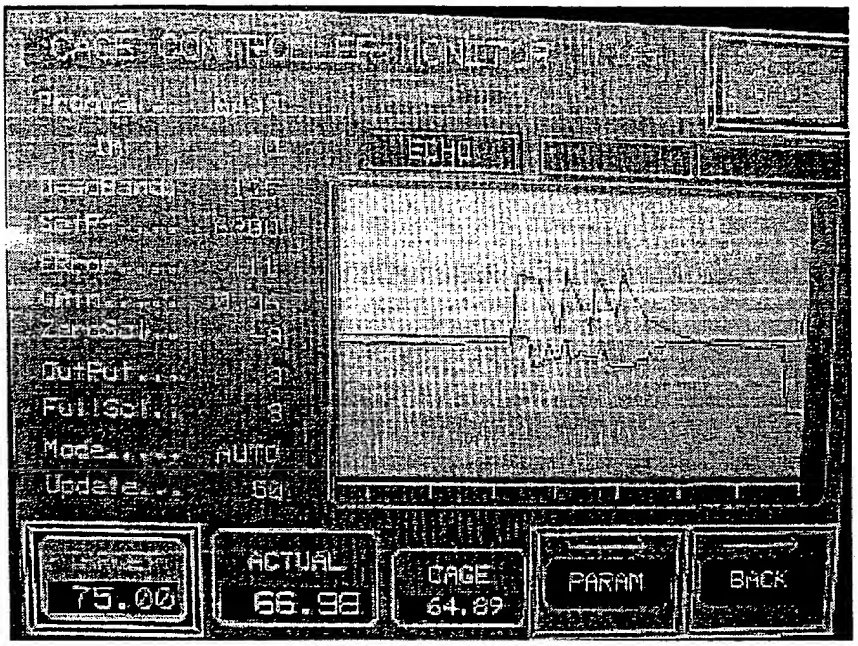


FIGURE 50

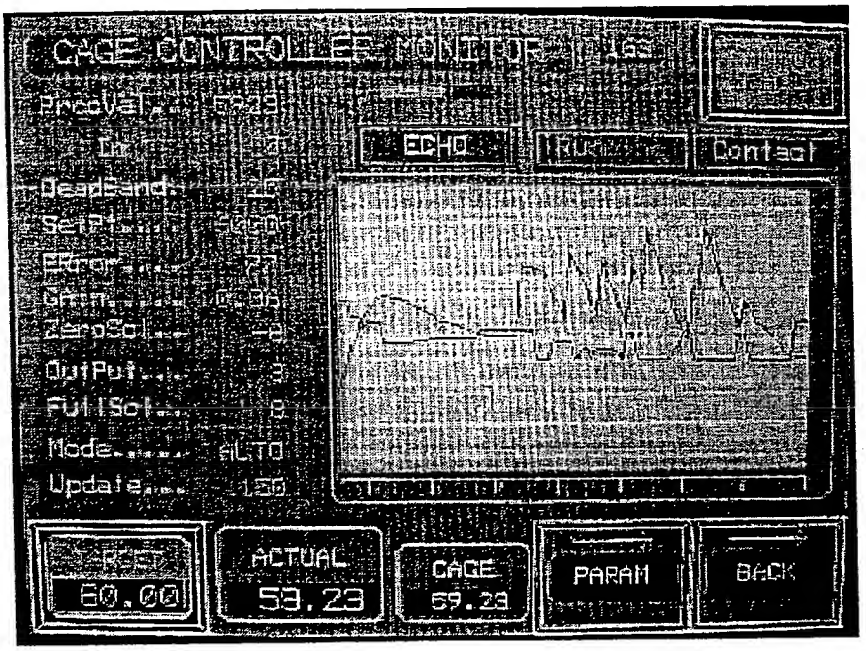

CAGE CONTROLLER MONITOR
ECHO
Contact
DeadBand...
ZeroSol...
OutPut...
FullSol...
Mode.....
Update...
ACTUAL
53.23
CAGE
59.23
PARAM
BACK
60.00

FIGURE 51

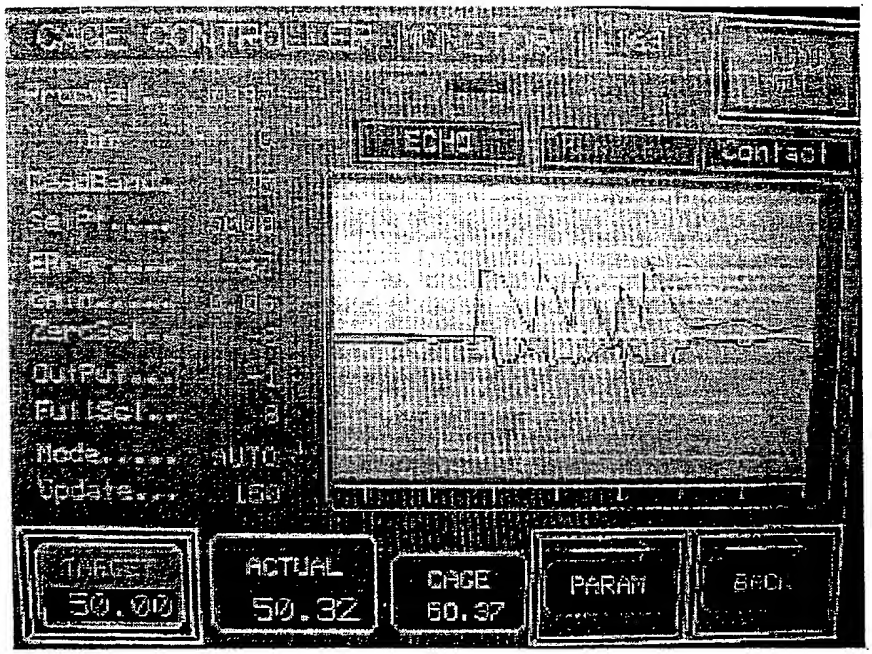

Contact
Output...
Fullscl...
Mode.....
Update...
ACTUAL
50.32
CAGE
60.37
PARAM

FIGURE 52

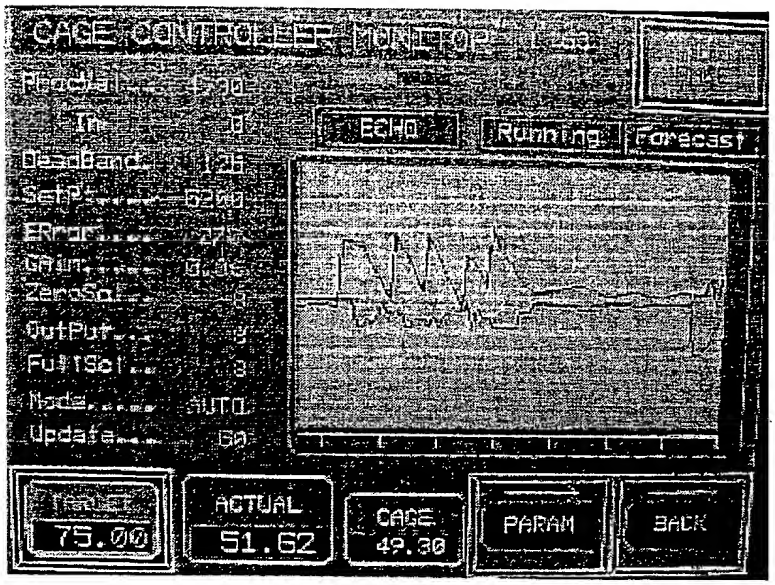

CAGE CONTROLLER MONITOR
ECHO
Running
Forecast
In
DeadBand
SetP
ERror
GAin
ZeroSal
OutPut
FullSal
Mode
AUTO
Update
60
TRACE
75.00
ACTUAL
51.62
CAGE
49.30
PARAM
BACK

FIGURE 53